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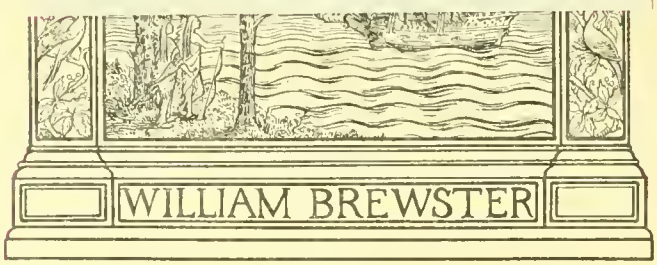

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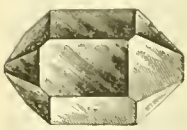

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VOL. IV. ALBION, N. Y., NOVEMBER 15, 1897. No. 1

Some North American Mammals.

THE SHREWS.

The Shrews of all parts of the world are distinguished by an elongated and pointed muzzle, external ears with two inner lobes, formed by the development of the antitagus and helix; feet, five toed, each with a distinct claw; the fore feet but a little broader, if at all than the hinder; the tail variable in length. They are spread over the northern hemisphere, some species running very far to the north, and although the smallest of the known mammals, sus taining the rigors of the severest winters. Species have been found in Southern and Central Africa, Asia, the East Indies and the whole of Europe; hitherto, the region of the Rio Grande, of Texas, has proved the American limit to the South, no well authenticated specimens having been brought from South America.

The skull of the Shrews has several peculiarities. It is narrow and long, much pointed anteriorily; compressed at the orbits, and in some species having a distinct crest along the crown. The malar bone is wanting, and there is no zygomatic arch. There is a deep fossa on the inner side of the coronoid process.

The teeth of the shrews vary from 28 to 32, although some authors give as many as 34 and 36. There are two very large incisor teeth in each jaw, directed nearly horizontally forward; the upper pair much curved and forming a hook; the lower straighter and usually with the trenchant upper edge more or less lobed. In the posterior part of the upper jaw there are four large teeth, the posterior much the smallest, each with numerous points. Between these and the large incisors are three, four or five simple and much smaller teeth; the last or posterior of these are usually very small. These teeth are conical, and have sometimes a large pointed tubercle on the inner side at the base. There are three multicuspid molars in the lower jaw, and between these and the incisors are two simple teeth.

The snout is extended some distance beyond the incisor teeth, and ends in a naked muffle with the nostrils pierced in the sides. The eyes are very minute, though usually discoverable on close examination. The ears are more or less distinct, except in the genus Plarina, where they are entirely concealed in the dried skin.

The food of the shrews consists chiefly of insects, worms and mollusks, but they are capable of attacking and destroying small vertebrates, and readily devour each other. They are very voracious, and require a large amount of animal food. They are nocturnal and more or less aquatic. They do not hibernate, but go about in the coldest weather. The young are born blind and naked.

Neosorex Navigator, Cooper; Water Shrew, Vancouver, B. C.—External ears small, hidden in the fur, which greatly exceeds them in length; longest hairs of the body a little over two lines long; feet and hands very small and broad; palms and soles, with the fingers and toes margined by a fringe of cilated bristles; the fore feet contained a little more than twice in the hinder, which are nearly as long as the skull. Tail much longer than the head and body (almost one-half longer,) with a distinct pencil at the tip; third lateral tooth smaller than the fourth; a very slight sub-terminal lobe to the anterior upper incisors; color above dark sooty brown, mixed with

hoary; beneath greyish white; tail, silvery white beneath; length of head and body 2 1-12, tail 3 inches.

The body is rather thick and full; feet very large, broad and long, entirely naked beneath, covered with short stiff hairs; hind feet about twice the length of the fore feet; the ears are small and in the dried skin very inconspicuous; the whiskers are numerous reaching back to the ears. The feet with the fingers are of a mixed brown and gray, except on the inner edge, where they are colored like the belly. The tail is like the back, except on the outer surface, where it is of a sharply defined whitish like the belly.

Sorex trowbridgii, Baird: Trowbridge's Shrew; Astoria to Steilacoom, Pacific coast.

Sp. Char. Ears very large not exceeding the long fur; fur full, longest hairs measuring over three lines; fore feet contained 1½ times in the hinder, which are barely a little more than two-thirds the length of the skull; tail as long as the body and half of the head; third lateral incisor smaller than the fourth; anterior upper incisor with a moderal internal lobe. Color above, sooty brown or black slightly variegated with hoary; beneath, a little paler and very slightly different from the back; head and body 2½ inches, tail 2 inches; hind feet over 5-10 of an inch.

Body slender, elongated; snout rather broad, depressed and pointed, whiskers numerous, moderately long and light colored; ears unusually large, although not longer than the fur on the nape, covered thinly with hairs on both surfaces, the region about the meatus, however, being bare; the supplementary lobe of the ear with long hairs springing from the extreme edge; fur on the body very full and soft, measuring three lines in the back; the fore feet are large in proportion and quite broad, contained about ⅔ times in the hinder ones; the palms are broad or broader than the soles, being naked and without fringes; the tail is as long as the body (exclusive of the head) and is covered with short, stiff, suppressed hairs, which are of equal size everywhere, and furnish but a very stunted pencil at the end.

Sorex vagrans, Cooper: Wandering Shrew, Cape Flattery, Wash., to Petalum, Calif,

Sp. Ch. Ears moderately large, though little more than half as long as the adjacent fur. Fur rather long and full, hairs on the back measuring 2½ lines. Feet rather small, anterior contained rather more than one and a half times in the posterior, which are a little over two-thirds the length of the skull. Tail longer than the body, scantily haired at the tip. Third lateral tooth above smaller than the fourth. Anterior upper incisor with a rounded internal lobe, in broad contact with its fellow. Color above olive brown varied with hoary. Beneath, dusky yellowish white. Sides a little paler than the back. Head and body two inches, tail 1⅔, hind foot about .47 of an inch.

Body rather stout and full. The ears are large and the aperture wide, the concha is not however as long as the fur and is usually concealed in the hair. The internal surface is well covered with fur along the upper margin, as well as on the edges of the supplementary lobes. The feet are rather small, the palm as broad as the soles, both naked with a slight cilation on the latter. The tail is about five-sixths as long as the head and body, slender, depressed and scantily clothed with short, stiff, depressed hairs, which constitute a very small pencil at the end. The skull is moderately slender anteriorly. The upper anterior has a second hook at the base, decidedly smaller, however, than the one in front of it forming the tip of the tooth, and about equal to the third lateral tooth. The first two lateral teeth are of about equal size and decidedly smaller than the fourth, which however is larger than the third. The teeth are all chestnut colored at the tips.

Sorex suckleyi, Baird: Suckley's Shrew, Washington to Monterey, Cal.

Sp. Ch. Ears quite large about as long as the adjacent fur. Longest hairs measure nearly two lines. Feet rather small, the anterior contained nearly twice in the posterior, which barely extend two-thirds of the skull. Tail considerably longer than the body without the head; well coated with hair; caudal vertebrate 16. Third lateral tooth above smaller than the fourth; width of skull rather more than half its length. Palate $\frac{3}{5}$ this length. Color above, light chestnut brown; beneath, grayish white. Length $2\frac{1}{4}$ inches, tail $1\frac{1}{2}$, hind foot .46 inch.

This species is very closely related to S. Cooperi, its distinctive characters being only evident after careful examination of teeth and skull as well as of external characters. The snout is elongated, the ears are conspicuous and are well coated with fur on the sides and edges, except around and in front of the moetus. The feet are rather small, the anterior contained nearly twice in the posterior. The palms and soles are naked, the latter with overhanging hairs. The claws of the first and fifth toes reach to the penultimate articulations of the adjacent second and fourth. The tail is longer than the body exclusive of the head. The skull is short and thick for this species of the group, considerably exceeding in this respect S. platyehincus. The breadth is more than half the length instead of being less. The third upper lateral tooth is decidedly less than the fourth.

Sorex pachyurus, Baird: Thick-tailed Shrew; habitat, Pembina, Minn., to Fort Ripley.

Sp. Ch. Ears moderate, though distinct; not half as long as the adjacent hairs. Fur very full, the longest hairs measuring over 5 lines. Feet and hands very stout and broad;the latter contained about one and a half times in the former, which are about two-thirds the length of the skull. Tail very thick throughout its whole length, with a decided pencil at the tip, about seven-ninths the length of the head and body alone. Third lateral tooth above larger than the fourth. No internal lobe to the anterior upper incisors, but these are somewhat widened and in contact near the rounded point. Premolars are not imbricated. Color above, light olive brown becoming much darker on the rump; beneath, ashy white with a tinge of brownish; sides of a tint of brown paler than that on the top of the head. Head and body $2\frac{1}{4}$ inches, tail to the end of hairs $1\frac{3}{4}$ inches.

The body of this species appears unusually stout and full owing to the length of the fur which exceeds that ot any American species, measuring on the back as above indicated 5 lines. Its large feet and claws and very thick tail are also highly characteristic. The ears are of moderate size, the concha short, scarcely more than a line high, not coming far around the moetus, and much shorter than the fur. It is scantily covered with hair on the margin of the internal face and with larger ones on the edges of the supplementary lobes.

The skull is slender anteriorly, though the muzzle is shorter than inS. navigator. The anterior upper incisor is bidentate, the posterior lobe or hook nearly as large as the anterior, and coming down nearly to the line with it and the next teeth; it is about the size of the third lateral tooth. The five lateral teeth overlap each other, diminish gradually and regularly from the first to the fifth, which is rather larger than usual and visible from the side. There are three very decided lobed serrations on the lower anterior incisor. All the teeth are chestnut at the tips.

[These descriptions of North American Mammals will continue through a number of succeeding numbers, possibly all the year. We would be very thankful to collectors for notes regarding any of them, of their own observations. Ed.]

Walter F. Webb.

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Vultures.

It is a fact well known among well informed people and especially among the ranks of American ornithologists, that the genus Cathartes is well represented south of the Mason-Dixon line. In consideration of the fact that the major portion of my obserbations have been in the Lone Star State, I shall in this brief sketch adhere strictly to notes made in Texas. But Texas is a huge state within the bounds of which half a dozen New England states could be deposited and still not be crowded. In all this vast territory lying between the Red River and the Rio Grande, the Panhandle and the Gulf of Mexico, my favorite oological collecting ground is in those counties forming the most southern point of the state—that section commonly spoken of as southern or southwestern Texas. Here few are the hours when several vultures may not be seen sailing high overhead, scanning the earth and things thereon as only vultures can scan and scenting as only vultures can scent. And their valuable services as scavengers are indispensable. Both species are resident and abundant; the Black variety is, however, largely in the majority. Of their habits and idiosyncrasies it is not necessary for me to speak for who is it that does not know the duty of a "vulgar buzzard?" My notes on nidification for the year 1896 happen to be before me—or rather a portion of them—and among them I find data concerning thirteen nests of the Black Vulture. Tabulated, they are as follows:

March 6, 1896. Two fresh eggs deposited on leaves by the side of an old log, the fork of which formed a V around the eggs. The log was lying near a small arroya. The birds were seen. Refugio Co., Texas.

March 8, 1896. Two fresh eggs deposited in cavity of hollow tree. Entrance five feet from ground. Birds were on the eggs. Refugio Co., Tex.

March 16, 1896. Two eggs in which incubation had begun, deposited in cavity of hollow tree. Entrance nine feet from ground. The birds were seen. Refugio Co., Texas.

March 12, 1896. Two fresh eggs laid on ground without sign of nest. The birds were seen. Refugio Co., Texas.

March 20, 1896. Two eggs in which incubation was started, deposited in hollow tree. Aperture ten feet from ground. The hollow was almost full of water from heavy rains but the bird was incubating the eggs nevertheless. Refugio Co., Texas.

March 29, 1896. Two fresh eggs deposited on bare ground in brushy motte of trees in a field. Not far from a small arroya. Bird was sitting on the eggs. Refugio Co.; Texas.

March 29, 1896. Two eggs in which incubation had started, laid on bare ground in small hollow in face of rocky cliff facing arroya Medio. Birds were seen. Refugio Co., Texas.

April 20, 1896. Two fresh eggs de-

posited on ground by side of log in motte of trees. Bird was on the nest. Refugio Co., Texas.

April 23, 1896. Two fresh eggs laid on bare ground. Birds were seen. Refugio Co.. Texas.

May 16, 1896. Two eggs in which incubation had begun laid on ground in motte of trees in field. Birds were seen. Refugio Co., Texas.

May 10, 1896. One egg in which incubation had begun laid on bare ground in motte of trees in field. Birds were seen. Rufugio Co., Texas.

May 18, 1896. Two eggs in which incubation had started. Laid on ground in weeds in motte of trees. Birds were seen. Refugio Co., Texas.

May 29, 1896. Two eggs in which incubation was begun. Laid on ground in bunch of chapparal on hog wallow prairie. Bird was on the eggs. Refugio Co., Texas.

In the foregoing thirteen nests, as you will see, only three sets were found in cavities of trees, the remaining sets being found on the ground. The last mentioned set of eggs is the only one I have ever found in an isolated clump of chapparal on a prairie, Those nests mentioned as having been found in mottes were generally located well inside the clump with a well beaten path leading to the eggs which were generelly deposited on a spot entirely devoid of any vegetation, presumably made so by the birds. It is not necessary to enumerate my finds for the year 1897 but I will mention one set a little out of the ordinary. It consisted of two eggs, far advanced in incubation, deposited in a cavity with a very small opening sixteen feet from the ground. The peculiar part of the data is that the eggs were almost entirely covered with water. Did this retard the progress of incubation or advance it, as it does in some cases? The weather was very warm and the hollow was exposed to the rays of the sun nearly all day. The bird was sitting on the eggs which were badly stained, but the natural markings were exceptionally beautiful and the eggs larger than the average. It will be noted that one set was found under similar circumstances in 1896.

Two or three hundred miles northwest of here this vulture is found breeding in the rocky cliffs of the Colorado River, depositing their eggs on the narrow shelves and in the small caves.

I have never found the Turkey Vulture nesting in hollow trees, having always found their eggs laid on the bare ground. April 16, 1896, I found a nice set of two eggs, fresh, of this vulture. The eggs were deposited on the bare ground by a log. The bird was seen. On the 17th day of the same month I flushed a Turkey Vulture from a small clump of chapparal and near the center of the clump I found a snowy infant of some two weeks' age and one rotten, infertile egg. This year, 1897, I collected a beautiful clutch of two eggs from this identical spot. May 20, 1896, I found a set of one badly incubated egg. This egg was laid on leaves in a thicket. The finest specimens of young in the white plumage I have ever seen I found in a bunch of chapparal this year June 14, 1897. The nests of this species I do not find nearly so often as those of the Black variety.

While there is some similarity in the eggs of the two species, there is little excuse for confusion, as they differ in size, shape, color of back-ground and diffusion of markings. I have seen many immaculate eggs of the Black Vultere but never of the Turkey.

Can any collector cite an instance of the vultures breeding in colonies as is mentioned by Oliver Davie in his "Nests and Eggs of North American Birds?" If so, I for one, would appreciate a description of such a colony.

JAMES J. CARROLL,
Belton, Texas.

Hints about killing Lepidoptera.

It is important when collecting in-

sects, to preserve their form, color and scale covering. With Lepidoptera the importance of such care is evident. Many rare and desirable specimens are found to be, when captured, more or less diverted of their hypodermal coloring; such individuals should always be preserved until replaced by better.

Avoid hastily killing by pinching, as such a procedure destroys the symmetry and relative position of the parts so treated. Do not unthinkingly and carelessly grasp the wings; but, on the contrary, handle gently with forceps or fingers, being careful to grasp the sides of the thorax from under the surface of the insect without applying too great compression; the appendages may often be utilized for this same purpose. The main object being to preserve the natural appearance of the specimens for study, and to give neatness and perfection to the collection, which always reflects great credit upon the collector.

The use of chloroform, either and cyanide of potassium as agents for destroying the life, is not entirely satisfactory as a rigidity is imparted to the muscular structures, rendering a quick and easy manipulation difficult, owing to the persistency of the positions assumed at death.

Exposure to the vapor of aqua ammonia produces complete flexibility, with the objection that it requires too long a time to sufficate the larger species, and the liability to bleach and destroy relaxation to the muscles is a deserdatum of great importance to the collector of these fragile and delicately tinted insects. Such a result can be obtained by the combined action of Aqua ammonia and cyanide of potassium.

Every collector of Lepidoptera should have two or three wide mouthed bottles or jars of different sizes the smaller to receive the micro-lepidoptera; the larger ample enough to contain the larger species Sphinigidae and Bombycidae; each jar or bottle should be prepared in the following manner: First place a layer of cotton in the bottom thoroughly saturated with ammonia, over this is to be placed a thicker layer of dry cotton, upon which the potassium should be placed and the whole surmounted by another mass of cotton, covered by a piece of thick paper, previously punctured and neatly fitting into the bottle in such a way as to hold the cotton in place. The jars should at no time be long inverted. It is best to prepare them a couple weeks before using, then add a fresh supply of ammonia and a good result can be obtained. Such is my method for killing Lepidoptera, and I have had excellent success, as shown by the rapidity with which I can mount my specimens, with the removal of scales reduced to a minimum.

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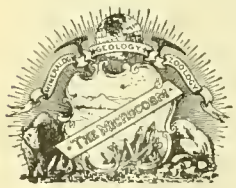

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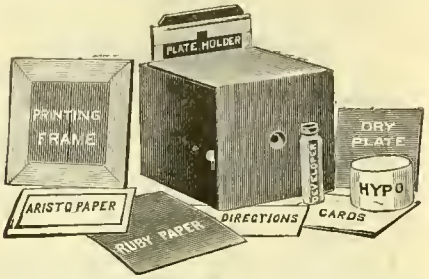

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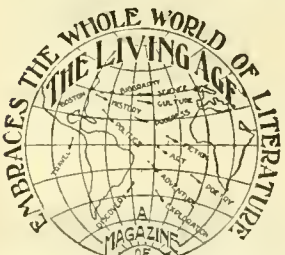

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VOL. IV. NO 2.

DECEMBER, 1897.

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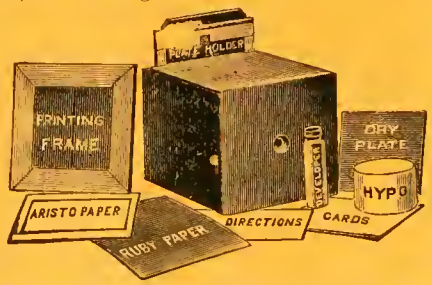

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A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., DECEMBER 15, 1897. No. 2

Two New Zealand Parrots.

Read before a meeting of the Biological Section of the Canadian Institute, November 8, 1897.

Before giving a description of the two birds which I have to show you it may be interesting to give a short description of the country, the home of the two Parrots. New Zealand consists of two large islands divided only by a strait (called Cook's) eighteen miles in width. The North and South Islands average 160 miles in breadth—the Northern one has an area of about three-quarters that of England and Wales and the Southern one is equal in area to that of England and Wales together. The mountains occupy one-tenth of the surface of the Northern Island and are covered with dense forest. One of these mountains runs to a height of 9100 feet. The Southern Island mountains occupy about four-fifths of its surface, but the greater part of these are open and well grassed. One of these mountains runs to the height of 12349 feet. The temperature of New Zealand resembles very much that of Great Britian. New Zealand is singular in the absence of all indigenous land animals, excepting two small kinds of bat and the rat which has already disappeared and the native dog is supposed to have been introduced by the natives on their original migration. New Zealand is also remarkable for its wingless birds, living and extinct. One was the Gigantic Moa but this bird has been long extinct. Colonists had to stock the Islands with all kinds of domestic, also with game and small birds. Out of the sixty-four million acres of area of the two islands twelve million acres are covered by forest and there are one thousand species of flowering plants on them.

The specimens I now have the pleasure of drawing your attention to was sent to me from Austria through the kindness of Mr. Harry Giddings a personal friend of my own who resided for many years there. He was formerly a resident of Toronto.

It is a Kea (*Nestor notabilis*). The genus Nestor embraces five species. According to Mr. F. H. Knowlton of the Smithsonian Institute, three of these are now extinct. The Kea is the larger of the two left; the length is 19 inches, the bill being nearly two inches, which is compressed you will notice and longer than deep. In Cassell's work they are called the Nose Cockatoos. Their home is in the island of New Zealand only and they seem to live in the interior and more in the mountainous sections rather than in the neighborhood of the sea coast. They make their nests in holes in the trees and sometimes on the ground among the rocks and lay four eggs. Their food some years ago consisted of corn, seeds and bulbs of the orchids, the bill being peculiarly long and curiously shaped enables them to dig the latter up. Now the bird has changed its food and lives as reported by Sir W. Bullen exclusively on flesh. It is supposed that the scarcity of food in the winter season drove them to the lower land where the raising of sheep was so extensively carried on and where they succeeded in getting the offal and heads of the animals thrown from the slaughter houses. The taste for animal food thus acquired, changed their entire mode of living and for some years past they have become almost entirely carnivorous.

In this way they have become a very destructive and annoying bird and have started to kill sheep for them-

selves by hunting together and in flocks. Two or three of them will light at a time on the back of a poor beast and tear with their formidable bills until they reach the fat surrounding the kindeys, destroying the poor animal, the fat they seem so eager to obtain.

The Kea, as may be supposed, is diminishing greatly in numbers every year for the inhabitants of the island carry on an incessant warfare against them for the protection of their flocks and it will not likely be very long before the bird is finally exterminated.

Mr. Knowlton, whom I before named, is authority for the statement that Salvadoric, who during last year monographed the group, states that there are about five hundred species of Parrots, belonging to seventy-nine genera at present known. Even though embracing so many variaties and making such an interesting and pleasing study, the bird we name has attracted probably most attention from its very peculiar habits as before explained.

The other species of the Parrot family you now see before you is called the Kakapo or Night Parrot and is said by Cassells to be considered the type of a peculiar race. Its whole appearance would certainly lead one to agree with so good an authority. Its scientific name is *Strigops*—Owl-faced—a name we can readily see is well chosen. The structure of the foot is entirely different to that of the Owl.

You will notice that the body is covered with fine, soft feathers and has a kind of veil about the face—wings short, tail long, rounded beak bent like that of the Owl and partially covered with bristles like feathers. The general color is dark green. The breed was confined to New Zealand. It was at one time rather abundant in the remote Alpine valleys of the southern island. In the northern portion none have been found for many years, and the opinion is expressed that few, if any, living ones are now anywhere to be had. The dry cliffs and low grounds near the banks of wooded rivers and high trees almost free from ferns or bushes, are where they are found, and when pursued will not make use of their wings but run swiftly off to some hiding place. Its movements resemble those of the barnyard fowl.

In Cassells', Lyall is mentioned as seeing the bird in some hills four thousand feet above the level of the sea. He found it on open spots near the river mouth not far from the coast. At the time of his writing on the subject, another writer named Haast said it was a most striking fact that the Kakapo was never found east of the mountains except in the valley of the Makavora formed by Lake Wanaka. These birds live in holes under the roots of large trees and in cavities and overhanging rocks. The first named writer—Lyall—said he found tracks about a foot wide and very regularly worn into the ground, made by the Kakapo, which he at first thought were made by the natives. Such tracks would be like our Indian trails of years ago.

The species is almost nocturnal in its habits and thus in that respect again resembles the Owl. Its cry is a hoarse croak. The food consisted of roots, leaves and delicate shoots of plants, berries and moss; also buds of leguminous plants. It was a great eater of innutritious food which accounts for its liking for living on the ground. The eggs were laid toward the end of Febrnary and never exceeded two in number to a nest usually only one. The bird only scratched a shallow cavity in the dry moss or decayed wood for its nest. The egg is pure white and only about the size of a pigeon's. The birds were easily treed and would follow their captors like a dog.

J. MAUGHAN,
Toronto.

DAMON'S MOUND.

A Lonely Mound in Southern Texas and Some of its Peculiarities.

All readers are more or less acquainted with the mounds of Ohio and circumjacent states and all have to a greater or less degree been regaled with lengthy surmises as to the origin and also the cause and manner of the construction of these monuments to the skill, energy and enterprise of a truly pre-historic race. Nearly every one who has traveled much in that section of the world, has inspected one or more of these mounds and is posessed of his own theory in regard to those who erected them.

The sight of a hill or a small mountain does not generally arouse much curiosity in the mind of the beholder. Many of us have been regaled by views of the wild wierd scenery of the rugged Rockies and also by travels among the less rugged but equally beautiful Alleghanies and Blue Ridges.

We have read, ever since we could read, many of the countless books, pamphlets and wearying newspaper and magazine articles in regard to the mounds and mound-builders of some of the Mississippi valley states. Even in youth our minds were fairly well filled with varied conjectures in regard to the social condition of these mound-builders and also the manner and the cause of construction of these now apparently useless heaps of earth.

Then we reached forth in a hopeful endeavor to solve the deep mystery over-hanging the construction of these untranslatable pages of history and to throw light upon the unknown lives of the builders and makers of these pages, but our efforts have so completely overwhelmed us with theories and suppositions that we are now actually bewildered by the multitude of our evidences.

While the mounds abounding in all the states located in the great basin of the United States have frequently been visited and also honored with lengthy flowery descriptions, the mounds of Texas have so far been totally ignored. Few people, even in the immediate vicinity of this mound have ever given the subject any serious thought and few people outside of the state have ever heard of the existence of this relic of a long gone race.

The travelers over the limitless prairies of southern Texas are burdened with curiosity as they see in the hazy distance a dark object piercing the horizon. They cannot see it clearly enough to distinguished what it is but at the same time the view is sufficiently accurate for them to know that it is not a cloud. Their speed is perceptibly accelerated and could we be near enough to hear their surmises in regard to the unknown object they would no doubt make interesting reading matter. After an hour's journeying toward it they are near enough to see that it is a mound of earth majestically careering heavenward. After another hour's travel and after crossing the winding Brazoo they find themselves at the base of this object of wonder.

Arrived there it requires only a moment for the eye of the experienced traveler to make sufficient examination to be confident that it is another page in the voluminous history of the prehistoric peoples

This mound is situated down in the southeast corner of Fort Bend county, twenty-five miles from Richmond, and near the line of Brazoria county. It has a circular base covering more than four acres of ground and its cylindrical body reachest an altitude of more than two hundred feet. From its summit the Gulf of Mexico is plainly visible and the sullen roar of the crashing breakers strikes upon the ear with regular cadences.

It is situated in the midst of a section of a monotonously level prairie country and stands forth a silent sentinel for all the adjacent lowlands. This mound rises abrubtly from the prairie and the line where the prairie ceases

and the mound commences is so clearly marked as to lead one to believe that, were the strength available, it had been taken up from some other section of the country and placed where it now stands.

The origin of this mound is vieled in deep and impenetrable mystery. There are no excavations in the vicinity to show whence the material for the construction of the mound was obtained; and even if there were the earth composing the mound is unlike that constituting the surrounding prairie.

On account of the resemblance between the earth in the mound and that in the bed of the river some of the settlers have advanced the theory that it was made of earth taken therefrom. To strengthen this theory they claim that the river, where it runs near the mound, is much deeper than anywhere else along its entire course.

Others claim that where excavations into the sides of the mound are made the earth therein shows that it was built of the sundried bricks which the Mexicans have always used as a building material.

If this mounds was ever used as a fortress or a place of burial or anything else of that kind all traces of the openings into the sides of the mound have been totally obliterated. There remains no record of any relics found thereabouts and no deep excations have ever been made into the mound. Its contents still lie buried with in its unexplored vaults.

The entire sides of this mound from peak to base are perennially clothed with a vegetation possessing a color peculiarly its own. The verdure seldom fades from the grass on the surrounding prairies but the grass on the sides of the mound is painted a darker green; closely resembling, the color of young corn growing in the alluvial soil sections of Tennessee. The color is so rich as deep as actually have a glossy appearance.

In an earlier day a small spring bubbled forth from the very top of the mound, and even now the trench worn in the side of the mound by the water from this spring is clearly visible although the water ceased to flow from the top many years ago.

At the present time a stream gushes forth from the side of the mound. This stream is not very large, but it is constant. The source, where this stream receives its supply, is a nice question for some scientist to elucidate. When we remember that the mound is more than one hundred feet higher than any of the adjacent territory, and when we also remember that it requires some extraneous force to raise water above its own level, we are indeed puzzled at this phenomenon. Does some unknown and unperceived action of the gulf or gulf stream produce this state of affairs?

The soil of which this mound is composed evidently contains some kind of mineral. A chemical analysis would doubtless divulge some interesting facts in regard to its composition. Opinions differ and in all likelihood will continue to differ in regard to the merits or demerits of this soil and water as a curative power for man and beast.

Some claim, that should a person take a small portion of the earth of this mound after it had been moistened by the water from the tiny spring and, after dissolving it in water, drink the solution, the effect produced would be exactly the same as if the person had taken a dose of calomel. Many people of that section used it for the same purpose for which other people use calomel. Many of the residents of that and adjacent counties kept bits of this spring—moistened earth—in their houses and these bits are highly prized by these people. Some of them claim that it is efficient and never-failing in its action on the spleen; others, that it is practically a remover of all malarial troubles.

In an early day much of the water from this spring was bottled and taken to Richmond, Texana and other neighboring burgs where a ready sale was

found for it. The Nassonite and other wandering tribes of Indians used to keep it with them all the time and also to make regular visits to this mound for the benefits which they were able to derive from using the fresh waters of this spring. From these tribes the earlier settlers leaned the medical qualities and so its use has been perpetuated unto the present time. The origin of the name of this mound is as much a curiosity as the mound itself is a mystery. Neither its name nor its fame have gone very far from home yet, but wherever known it is spoken of as Damon's Mound. The "oldest inhabitant" first knew it by this name.

H. M. Brown.

Indiana Notes.

(iv.)

AN ABORIGINAL VILLAGE SITE.

The different grades of aboriginal intelligence that is brought to light within a radius of a dozen miles, is very astonishing. Various localities produce different forms of implements, but the finding of an Indian village site that was inhabited up to a reasonable late date, tho' judging by the *rude flint implements* they left behind, one would infer that they were made by a people possessing very little skill in the manufacture of flint implements, is very strange to me when we consider the lateness of the habitation of the village grounds. And then the old village site lies within a locality *noted for its fine archaeological specimens.*

The village site I refer to is situated in the bottom lands of the beautiful White Water Valley in Franklin county, about two miles below the little town of Laurel. The White Water River running north and south divides the village grounds into two parts. That on the east side is of a rolling nature until it reaches some hills of a more steep ascent, while to the west a high bank overlooks the river and back of this the village was nestled under a hill of great height for this part of the state. From the top of this hill a splendid view of the surrounding country can be had, and was, I suppose, used for a signal station, as a number of other heights were used for such purposes.

Great numbers of "relics" have been found on the village grounds, but the only specimens found by my companion (Fred Kurtz), and myself, were a lot of arrow-heads, spear-heads, scrapers and one broken drill. The leaf-shape implement predominated over all other patterns and it is surprising to note what little labor was spent on some specimens to attain the desired shape. Only one *notched* arrow-head was found by us and it being of a bluish color leads me to believe that it is foreign to this locality, as the greater portion of the "relics" are whiteish in color. About two miles south-west of the old village grounds are what is known as the Derbyshire Falls, and in the vicinity of these lovely productions of Nature, I saw flint rock of the same color as the implements mentioned above, and I believe the aborigines obtained the material for their weapons at this place. As to where their shop was, I cannot say, for there is no evidence that the rock was worked to any great extent on the village grounds. Future investigation may bring in to light.

Nearly all the flint implements are very thick and vary from 1½ inches to 4 inches long. One long "splinter" of flint shows signs of use—used as a drill (?).

We were not fortunate enough to find an ax but I bought one (for 10 cts.) a fine specimen, also a slate gorget at the same price. Both specimens were found on the village site but they show far more skill of workmanship than the flint implements do. Other axes, etc., showing great skill *in that line* have been found, but the question is, why was such little care taken with the *flint* implements in that one locality when for miles around, in all

directions, implements of delicate workmanship occur in more or less abundance? Can it be that the workman was a novice in that branch of industry? ALLEN JESSE REYNOLDS.

Connersville, Ind.

Wild Pigeons in Nebraska.

A recent report from Nebraska states that a flock of from seventy-five to one hundred wild, or passenger, pigeons had been seen in that State. This will be interesting news to those who remember the birds when they flew in countless thousands like dark rivers, across the sky during the spring migrations. Some grizzled old trappers, who regularly followed the flight of pigeons and netted them by thousands per week have for years gone on hoping against hope that the flight of pigeons had merely been diverted from the old routes, and that the birds would some day reappear in all their former numbers. This idea of course is erroneous; the pigeons are not haunting inaccessible sections of the country, they have been destroyed. During the early autumn of '87 I shot a lone pigeon, a male of that year, near the city of Eau Claire, Wis., and a few days later I saw a flock of perhaps twenty-five birds flying low near where I had shot the single one. In March, 1894, while traveling by train near London, Ont., I saw four pigeons fly east. The day was very mild, with a warm rain falling, and the pigeons passed in plain view. It was just the sort of day we used to deem the best for pigeons in the long ago when one gun could bag more birds than a man could carry.—Ed. W. Sandys, in November Outing.

Mr. W. S. Townsend, of Perry Oklahoma, reports that last June a farmer living 12 miles east of the town, caught with steel traps a pair of Albino Turkey Vultures. Both were taken the same day and were undoubtedly mates. The female, I should judge by her size, has a few black feathers on her wings and back. They are now owned by a second-hand dealer of this city. Wild Pigeons are still quite common in parts of Indian Territorty.

THE MUSEUM.

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Walter F. Webb, Editor and Manager

Albion, N. Y.

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Notes.

We are promised a fine article from the pen of our friend, Mr. Van Epps for our January number. Many of our subscribers remember the series of articles on the Mohawk Country contributed to the MUSEUM a year or so ago. This time we shall hear about an interesting cave in Central New York.

"Sketches of Some Common Birds" by P. M. Silloway is at hand. This is a neat volume of 300 pages on the bird life of the Mississippi Valley. Most ornithologists are familiar with the writings of Prof. Silloway on bird life and will welcome this volume with delight. The notes have been collected from a great many years of close study, and teem with interest throughout. The price, $1.50, is so nominal all collectors should possess a copy.

We call your attention to the fact that we have at considerable expense

prepared a catalogue of illustrations of many of the finer showy shells. This list will figure nearly 200 species and we trust will be found handy to shell collectors both in identifying shells and in bringing to their notice pictures of many rare and desirable species. It will be ready about the time subscribers get this copy of the MUSEUM, and a copy will be sent to any one notifying us with a 2ct. stamp enclosed. As we have recently come into possession of a very fine and rare collectiou of nearly 20,000 shells which will be broken up and sold in as small lots as desired, we shall be able to supply our friends with nearly all shells illustrated in the list at nominal prices.

Among the Alaska Siwash.

Of the various parts of the globe that delight the curio hunter, Alaska in our own country can offer a fine field in the way of curiosities and implements of a little known race of people, the Siwash Indians.

Now that the eyes of the world are turned on Alaska, it is well to remember that "all that glitters is not gold," for to the eyes of some, the sight of an old and battered implement of other days has a fascination equal to the spell that the yellow metal has for the prospector.

In many of the low flat houses along the beach are found queer carved boxes that contain their "iktas". A preserved collection of family heirlooms that have been handed down from generation to generation, each with histories. When one hears their queer designs translated, they imagine their ancient owners were a very gifted and wonderful people. Many relics they refuse to part with, others can be bought if you have the price and many of the modern articles are openly offered for sale.

The old articles represent ivory and stone dishes, spear heads, and various ornaments. The designs carved on their surface represent various creatures but idealized to such an extent as to be hardly recognizable. Other old pieces may be of stone fashioned into pipes, axes and fleshers, often inlaid with abaloney shells. Other thin, shale-like pieces of rock of uniform size, having odd designs on the surface and a hole or two near the edge are said to once have been the currency among the people.

The various paraphanalia of the old medicine men is now rapidly becoming very scarce, their practice being no longer tolerated among the more advanced tribes. His ingeniously carved

rattles are now rarely seen—hollow affairs, grotesquely decorated, that were believed to keep off the devil. About all they wore on their "visits" to the sick is a necklace of human bones that are sometimes found in the dead houses where these special people of the tribe were buried. The various articles formerly used in their

dances are also passing out of use, as the Chilkat blankets of mountain goat wool, robes of eagle down, and queer ornaments made of feathers, fur, bird bills, animal teeth, etc., and fancy carved sticks and poles illumated in fancy colors.

More modern things in daily use today are spoons made from the horn of the mountain sheep and white goat with elaborately carved handles of different shapes. They weave beautiful baskets from grasses and roots, making rain-proof hats and serviceable mats from the same material. In the matter of making minature models of their canoes, grave images and famous toten poles, they are very expert and their handiwork is much sought for.

Late years has witnessed a rapid change in the Siwash. The original savage and his belongings are fast fading before the march of civilization to give place to the coming generation that wear store clothes instead of furs, gets drunk on whisky instead of "hoochinoo" and packs a six-shooter instead of a whalebone bow.

GEO. F. CANTWELL,
Juneau, Alaska.

The Prairie Horned Lark in Nebraska.

This species with the exception of the Little Englishmen is our most abundant resident species, although some years it is not nearly so plentiful as others. As south-west Nebraska is very changeable in regard to winter it makes a considerable amount of difference as to the numbers of these hardy "Larks" that stay with us. Our coldest winters seem to be when this bird is the most plentiful.

The winter of '93 was a very mild season there being only two hard storms, and during this winter I believe the Prairie Horned Lark could be termed *very rare*, but, however, the next winter, '94 was one of our hardest winters, and then it was that this species was with us in countless numbers.

On the mornings of cold days that winter I have seen flocks that would no doubt number into the thousands, but as the day would advance they seemed to disband into smaller flocks to feed, in the barn-yards, along road sides and on stacks, but towards evening they would band together again and seem very restless, at this time they were killed by the local sportsmen in countless numbers. One young would-be-sportsman here boasts on the number of fifty six that he secured at one shot during February in '94. But I am glad to say that now it is rather going out of date to hunt for our little friend.

One cold March morning in '94 I found five of these hardy fellows lying in a straight line frozen. I could not make out the cause until I had seen the clothes line which was about six feet high. Perhaps a large flock had gone by and these were the ones that "struck" and were stuned and so froze to death. Many times have I brought this bird into the house half frozen and starved, but after warming and a good feed they were as lively as a cricket and ready to join their companions in a few hours. I once kept two males, Tom and Jerry, for about six weeks. They became very tame and would come to their call.

In April these birds are at their highest plumage, then the males are singing at their best and they can be seen along the roadway or on posts crouched as if ready to fly, warbling away, and always ending their song with a chromatic run for about one octave, then they give their wings to flight, circle around a few times and nearly always coming back to the same place, if not disturbed.

I have never known but I think these birds pair off at all times during the year, or that is during their nesting season which to them is fully half of the year. I have seen nests with young as early as March 2d and as late as July 20th, but very much earlier dates have been recorded.

Their first set is nearly always situated on the southern slopes of hills or in warm gulches where the snow, if any, is off the ground first. I have seen young birds in the spring that could not fly that must have stood very hard "Nebraska Blizzards" but I have never found any frozen young or eggs.

They generally rear two broods a season and three is not uncommon. The second nest is to be found in corn fields or in heavy bunch grass, and the third set I have found most generally in canons or on rough land. The number of eggs range from three to six but four seems to be the prevailing number. In my experience I find the first sets of darker color and with a very glossy appearance, while the second and third sets grow lighter and instead of being glossy have a chalky appearance. The shape also differs in the three sets, the eggs of the first being larger and more elongated than the other sets and shells are also very much thicker, which of course is to brave the cold weater.

Their diet is exclusively seeds and grass stems. I have never found the crop to contain any form of insect or worm. Their nests are composed of grasses and thistle weed cotton, the first nest being well constructed to stand the cold weather, but the second and third nests are very flimsy affairs, only consisting of a few grasses and very coarse weed stems.

In all, I think this species one of our most interesting, and can bear very much more study and observing.

J. Earl Ludwick.

McCook, Neb.

Nebraska Academy of Sciences.

The eighth annual meeting of the Nebraska Academy of Sciences was held in Science Hall of the University of Nebraska at Lincoln upon November 26th and 27th.

A brief business session was held before noon upon the 26th and in the afternoon the programme was opened by the address of President A S. Von Mansfeldt upon "Some Practical Applications of Science." This paper thoroughly treated of the effects of alcoholics upon the human system, the prevalence of excessive drinking, etc., and the speaker asserted that "the solution of the problem lies within the province of scientists, whose mission is to bring all sides of truth before the people, etc." The address was followed by a spirited discussion, as were nearly all the other papers upon the programme.

Dr. H. B Ward of the University of Nebraska presented a paper entitled "Factors in Civilized Life Which Modify the Abundance of Parasitic Animals," wherein the decrease of parasites infecting man was shown to be due to better care of the body and more thorough cooking of all animal foods. The decrease of parasitic diseases among domestic animals has been brought about largely by stall feeding, improved devices for furnishing pure water and thorough methods of slaughtering, whereby all parts of most domestic animals are converted to some use.

"Our Beds of Diatomaceous Earth and their Associated Fossils" was next presented by Dr. E. H. Barbour.

The "Flora of a Dried-up Millpond" by C. J. Elmore was an interesting and instructive paper. In the pond referred to more than 40 species of flora were observed and the method of their seeds having been deposited was discussed.

Dr. C. E. Bessey next presented a paper entitled "Poisoning by *Rhus radicans* Without Direct Contact", which exhaustively discussed the poisoning by ivy without having been touched in any manner. Several of the members present reported having been poisoned by the poison ivy without direct contact.

The following papers were presented in the order named: "The Ferns and Fern Allies of Franklin County, Nebraska," by E. M. Hussong; "Ob-

servations on the Abundance of Certain Secondary Prairie Formations," by Dr. Roscoe Pound; "The Peat Beds and Underlying Datomaceous Deposits along Cedar Creek and Tributaries," by J. P. Rowe; Some Notes on Root Growth," by Prof. F. W. Curd; "Notes on the Germs *Ichthyotaenia*," by H. M. Benedict, describing a new species of fish tape-worm; "A Second Nebraska Meteorite," by Dr. E. H. Barbour, who exhibited the meteorite for examination; "On the Use of Color Screens in Astronomical Photography," by Rrof. G. D. Swezey; "On the Experimental Proof of Faraday's Theory of Electricity," by Louis T. Moore; "Karl Pearson's Researches in the Mathematical Theory of Evolution, by Prof. E. W. Davis; "Report of the Morrill Geological Expeditions," by Carrie A. Barbour.

At 6 p. m. the members attended a Thanksgiving social tendered by the Lincoln members to the Academy and partook of a delicious repast. At 8 p. m. U. S. Geologist N. H. Darton delivered an address upon "Some Features of the Geology of Nebraska", illustrated with a stereopticon.

November 27th the session was resumed with an "Announcement of New Nebraska Fossils," by Dr. E. H. Barbour; "Supplement to Professor Bruner's List of Nebraska Birds," by W. D. Hunter, showing a marked tendency of the birds towards extending their ranges eastward; "Progress of the Botanical Survey of Nebraska," by Dr. Roscoe Pound; "Observations on the Concretions of the Pierre Shale," by Miss Carrie Barbour; "On the Taxonomy of the Nemathelminthes," by Dr. H. B. Ward; "Disproof of a Supposed Theorem in Topography," by Dr. E. W. Davis; "On the Genus Atax," by Dr. R. H. Wolcott, describing six new species of mites which infest fresh water mollusea; "Additions to the Insect Fauna of Nebraska," by W. D. Hunter.

The session closed with the election of the following officers for the ensuing year: President, Dr. H. B. Ward; vice-president, A. S. Von Mansfeldt; sec.-treas , Prof. G. D. Swezey; custodian and librarian, Prof. Lawrence Bruner, and adopting resolution commending Hon. Charles H. Morrill for his endowment of the Morrill Expedition Fund which is to support an annual Geological Expedition for the University of Nebraska.

ISADOR S. TROSTLER.

Omaha, Neb.

WONDERS of Bird Life. The "Story of the Farralones" will be a treasure to you for its lavish illustrations and graphic descriptions of this famous isle off the coast of California. It is almost as good as going yourself, and the book, a work of art, is selling now at only 30 cents, two to one address 50 cents. "Taylor's Standard Egg Catalogue," sold for 25 cents, gives the scientific and common names of all North American birds and the valuation for their obtainable nests and eggs adopted by exchangers Valuable back numbers of "The Nidologist". on sale. Address H. R. TAYLOR, Alameda, Calif.

WANT U. S. postage and revenue stamps and watch and medicine. Offer, shells, fossils, etc. D. H. EATON, Woburn, Mass.

FOR BEST OFFER cash or exchange 1 carved coffee cane, coat of arms of Mexico and a rattlesnake. By my system of exchange get a mineral cabinet free. Wanted amethyst, crystals, gem stones in the rough, curios, Confederate money and stamps. Send stamp for particulars. No postals. ROBERT BURNHAM, 143 Gallup St., Providence, R. I.

WANT one copy each of Bendire's Life Histories of N. A. birds Vol. 1 and 2, also Baird, Brewer and Ridgeway's Land and Water Birds all or any of volumes. State condition and lowest cash price or if you will trade what is wanted. CHAS. K. REED, Worcester, Mass,

SHELL COLLECTORS.—We intend to greatly enlarge our stock the coming winter and make many exchanges with collectors. Please send us a list of any Land, Fresh-water or Marine Shells you have to offer. We want Helix as ever and wish all collectors who have any duplicate Helix to send us complete lists. Anyone knowing of any large shell collections for sale will confer a favor by advising us of same. W. F. WEBB, Mgr., Albion, N. Y.

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A BEAUTIFUL SHELL COLLECTION

To be broken up and sold in parts to the collector that is in want of fine shells from any horizon.

We have lately purchased a fine shell collection, and will have same on exhibit for sale about the 24th of December, or January 1st at the latest. It is without question the finest assortment of Marine shells, largely univalves, that we have ever handled, and collectors making a collection of shells, will have the opportunity to get some rare things that we doubt if any dealer in the U. S. has on hand. One noticeable feature is the perfectness of all specimens, so that we expect to please the most exacting collectors.

Here are some species of Cypraea of which there are large suites: *Achatina, Albuginosa, Annulus, Arabica, Argus, Artafelli, Asellus, Atomaria, Caput-serpentis, carneola, caurica, cervinetta-cinerea, clandestina, cribaria, cruentata, cylindrica, Eburnea, errosa, errones, exanthema, felina, fimbriata, flavcola, gangrenosa, helvola, hirundo, histrio, icterina, irrorata, isabella, Lamarckii, lurida, lynx, maculata, mappa, mauritina, moneta, mus, neglecta, nigro punctatus, occellata, pantherina, picta punctulata, scurra, Sowerbyii, Spadicea, Spurca, stercoraria, tabescens, talpa, testudinaria, tigris, turdus, undata, ursellus, varicolaria, vitellus, zigzac*, besides a large number of species, represented by from 1 to 6 specimens.

In Murex we have *adustus, Ranskii, bicolor, brandaris, bulbosa, chrysostoma, crinaceous, fasciatus, haustellum, martinianus, microphyllusa, moticella, nitidus, nubilis palma rosea, palmiferus, pinnatus, plicatus, ponum, ramosos, regius, rosarium, saxitilis, scolopax, tenui spina, torrefactus, triqueter, truncculus, turbinatus, xanteostoma, etc., etc.*

In Voluta we have *Angasi, fulgetrum, imperialis, musica, Norrisii, pulchra, reticulata, rupestris, scapha, Turneri, undulata, vespertilio, vexillum zebra*

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JANUARY, 1898.

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The Argonatas were broken some, but a number of fine specimens remain, notably some beautiful Argonata tuberculosa from the Indian Ocean. These will be offered at very reasonable rates. A number of fine Nautilus Pompilius and umbilicatus, can also be had, of varying sizes down to one inch in diameter.

Some of the Cypraea,, Murex and Voluta were noted in last number.

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In Pterocera, we have some beauties, as aurantia, bryonia, chiragra, elongata, lambis, millepeda, rugoso and scorpio.

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THE MUSEUM.

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Mitchell's Cave.

P. M. VAN EPPS.

I.

Mitchell's Cave is in the heart of the elevation known as the Little or South Nose, or as it is locally called "Nose Hill," a very prominent feature in the landscape of the Mohawk Valley near Sprakers, Montgomery Co., N. Y. The Little Nose is an elevation of 740 feet above mean sea level. The entrance of the cavern is on the 680 foot level and is nearly or quite one half mile south from the river.

Mitchell's is an anomaly among caves! Having peril enough in its descent to satisfy the most fastidious cave-hunter—having its underworld of stalactite drapery—in its lower corriders springs and pools of water—pools of water held in check by mimic dams of tufa—with chambers whose ceilings are hung at such dizzy heights that no light has yet disclosed them, yet this fascinating revelation for the scientist is not a cave in the true sense of the word as we ordinarily understand it.

Not only does Mitchell's Cave differ from the ordinary cavern in the mode of its origin but also in that it is found to be situated entirely in the Calciferous sandstone, a rock formation that seldom contains caverns of any great size or extent. The Calciferous sandstone strata of eastern New York present areas which are found to plentifully abound in seams and joints. Many of these crevices form the courses for small subterranean streams but these streams seldom enlarge their conduits to any great extent owing, in part, to the extreme hardness and tough flinty character of the layers, but more, to the barrenness of lime in the Calciferous strata.

Partly to erosion and partly to chemical decomposition of rock masses by acidulated water are we indebted for the noted caverns of the world. These are found invariably to be in rock strata far richer in lime than is our Calciferous sandstone, despite its limy name. The Trenton and Helderberg limestones and still later calcareous rocks of Devonian age contain our greatest caves.

So we find the true cave to be a series of chambers and corriders—of passages great and small, torturous and intricate often; all carved and worked out by the mechanical and chemical action of subterranean waters following the natural seams and joints of the rock. Here slowly tearing down the solid fabric of the globe: there more slowly rebuilding in some fantastic form of pendent alabaster or stalagmitic growth,

Mitchell's on the contrary, is an enormous vertical cleft or rift in the Calciferous sandstone dividing the substance of the mountain as though it had been cheese stricken through with some enormous cleaver. The portion of this ancient rent not filled with glacial detritus and rubbish constitute the present cave.

The primal caves of this great cleft we will not here discuss further than to suggest that it was doubtless produced by some orogenic movement widening a pre-existing seam at a time coincident with the faulting of the entire Mohawk region. Its line of direction is parallel with the faults crossing the Mohawk country as mapped and described in the recent reports of the State Geologist. In fact, one of the fault lines mapped by Darton crosses the river but a short distance to the east; less than a mile. Could the cleft of Mitchell's Cave be

explored to its very lowest depths it would most likely be found to extend downward to the crystalline or gneissoid rocks, which at this locality are found directly underlying the Calciferous. However, the cleft itself is not a fault line. It may have been, and doubtless was, produced by the disturbance of the underlying rock at the time of the faulting of the region, but the opposing walls show no vertical displacement. It appears merely a seam widened by some movement of the under-crust and afterward partially modified and made cavern-like in its lower regions.

The crevice, where exposed underground, is from three to five feet wide, except in its very lowest explored portions where it has been in places eroded and enlarged until a considerable width has resulted, the farthermost and deepest chamber being 23 feet wide.

It is only in these lower corridors that Mitchell's bears much resemblance to a true cave, for here only do we find any extensive deposits of stalactitic growth, or notice the effects of decomposition or erosion. Yet throughout the entire known length and depth of the cave we do not find a single side passage or lateral gallery to excite our curiosity or to tempt the explorer to thread its unknown mazes. Nothing but the one great cleft almost uniform in width except in its lower depths as before stated.

The problem of exploration, however, is not so simple as might be inferred from the above description. The tremendous cleft is partially filled with rocks and debris much of which has lodged at different heights forming floors of different slopes and of greater or less length. These floors or landings end suddenly making it necessary in places to use a rope to attain the next level above or below.

In "doing the cave" we first make a vertical descent of 16 feet, from the surface, then, following a rapidly sloping descent leading northward we come to a very small aperture through which we must pass would we see the wonders below and beyond. Just through this exceedingly "tight squeak" we find ourselves on the brink of an overhanging precipice which requires for its safe descent a strong rope well fastened to the rocks behind us. From this onward our only pathway is along a narrow projecting shelf, jutting but a few inches from the left wall and which we notice slopes rapidly downward until lost in the darkness. It is a dangerous-looking pathway but the only alternative. Curious rows of bats, like embryonic fiends, hang by their hooks along the smooth perpendicular walls and squeak and grind their teeth as we pass by. Given a few flames coming from the chasm at our feet,—a few choice fat mediæval flames casting wierd upshooting Doresque shadows and a Dante would have nicely appreciated the scene. The cleft here reaches open high above us and below our narrow pathway drops to an unseen depth. With extreme caution we brace ourself against the opposing wall and slowly pick our way along the narrow and declining path. Should we slip we would have a terrible fall. However, the depth of this chasm has been grossly exaggerated. Said Martin Carson, who visited the cave in 1837—"The passage leading from the second to the third room was the most difficult and dangerous part of the whole descent, there being between these rooms on the north side of the passage, which led along a shelving rock ever wet and slippery, a deep narrow and perpendicular chasm, which reminded us of the bottomless pit; stones cast into it sent back their flinty echoes from a depth which we feared to calculate. Great care was necessary in passing this dangerous opening."

Had Carson dropped his hat down this "bottomless pit" he would, however, shortly have regained it, for soon the narrow pathway ends in a jump-

ing-off place. Dropping a few feet onto a good solid floor we turn abruptly and pass southward through a long passage which leads us directly under the way of danger just passed which iles many feet above us in the open cleft. Presently the cleft closes in over our heads and we find ourselves in a tunnel-like passage which still leads downward. Shortly we arrive at a place where the passage is enlarged somewhat in width but it soon again contracts.

We have now zigzaged our way down the ancient cleft to a considerable depth and from this point to the end of the cave we will need no more ropes. It is either crawl or walk (two crawls to one walk) but at last after a miserable journey through an exceedingly damp "worm hole" we emerge to our delight in a chamber in which Goliath of Gath might stand erect without any danger of bumping his noddle or doing damage to the point of his spear. For, ceiling, --there is none, at least none visible. "Hold up your torch." Do you see the roof? "No!" We will let off some of those big Roman candles. The colored balls go whizzing upwards disclosing the grim vertical walls far above us but the ceiling they do not reach, nor can we see it. At our last visit a blazing ball after reaching the limit of its flight and partially illuminating for an instant the tremendous rent, turned, fell a short distance and then lodged on a mysterious broad gallery-like shelf which seemed to extend the length of the chamber but at an unattainable height above us. Here its life of light was almost instantly spent, giving us but a second's view of the unknown and leaving the upper darkness more intense than before.

This chamber, which is of considerable size, has an almost level floor. The angle of meeting between the side-walls and floor is almost as sharp and clear-cut as in the room of a house. Lengthwise across its floor, to the left, runs a tiny shallow stream of water. At the extreme end of the room it is embasined by some minute dams of calcareous tufa. But the glory of the chamber is the twin columns of white, which from the floor to the right, stretch upwards against the rocky wall far out of sight. This incrustation of stalactitic growth simulates two noble pillared forms which rise alike, then at an equal height break alike in numerous separate fluted pillarets which again reunite in two fantastic flowered capitals. From these ornate capitals the twin columns reach upwards to an unknown height. We made an attempt to photograph them but owing to the smoke from the many torches, and fireworks used, the result was poor. We should have exposed our plates at once upon entering the room.

Leaving the "House of Goliath" at its farther end we scramble up a precipitous rock and soon find ourselves in a chaotic passage where it seems to have rained big masses of rock, some of which caught between the opposing walls and hang threateningly over our path. Picking our way cautiously over and under these ponderous blocks we come to a pause before a low arched opening,--another "worm-hole." This "fat-man's-misery," 18 feet in length, has a nice comfortable floor of mud and clay but it is the only known way of access to the Grand Rotunda, the most beautiful and largest room of the cave. The Grand Rotunda is 52 feet in length, half as wide, and, like the House of Goliath, has no visible ceiling. Martin Carson speaks of this chamber as the thirteenth room, the largest of the cavern, and describes it as being a large rotunda studded with beautiful stalactites of various shapes and sizes.

At our visit in November, 1896, we found the difficult entrance to this chamber half-filled with water and consequently did not attempt to enter. To accomplish the feat one has to lay flat and slowly twist and wiggle through. However, I shall append a

short description of the chamber, kindly given me by C. F. Van Horne, who visited the cave in August, 1882, and at various subsequent dates. "No dome or ceiling was visible, the walls on every side being lost from view in the mystic shades above, and resembling high pillars with their masses of stalactites. * * * From an extreme corner of the Rotunda an inclining passage led toward a pond of water about 15 feet in circumference and three feet deep, beyond was solid rock and further progress was impossible. Undoubtedly we had arrived at the river Styx and just beyond our sight was the 'dark Plutomian shore.' * * * Nearly the whole floor of the Rotunda was covered with stalagmites. The columns of stalactites were fluted in fantastic shapes and in some places jutting out resembled high epaulettes."

The Prothonotary Warbler.

Sunday, May 24, 1895, was the day we had set to hunt for the nests of the swamp warbler, *Prothonotaria citrea*. By we I mean Dr. J. R. Maguire and wife and the writer and wife. The locality that we desired to search was a half mile of swamp land lying between Grass and Thompson lake, about eight miles from Lewiston, Ill. The doctor is a good Presbyterian, but is so thorough a naturalist, that he has no compunctions of conscience on the subject of collecting birds eggs, shells, or geological specimens on the Sabbath day. After bending over a dentist's chair all the week, he believes it no sin to get off to the woods on Sunday and revel in the beauties of nature, but he draws the line on a gun. As for the writer, well, he is so agnostic that it does not matter much what he believes.

After an early dinner we drove to the swamps, arriving about two o'clock. Making our horses safe and comfortable, we at once plunged into the low scraggy growth of willow and ash. There was a plenty of holes in the live trees as well as in the old dead snags and stumps to afford nesting places suitable to the wants of the warblers. And they were here in great numbers, their clear whistling notes were to be heard on all sides. The ground was almost dry and had it not been for the flag and smart weed, the hunting would have been quite easy compared with other seasons when it all had to be done in boats. Nevertheless the ladies decided to accompany us, and in order to cover the ground in the shortest possible time, we agreed to divide forces, the doctor and wife to hunt down the slough towards the head of Thompson, while the writer and wife would hunt up towards the foot of Grass lake. The swamp was full of nests of the bronzed grackle, red-wings and doves. Some of the nests of the grackles contained full complements of fresh eggs, while in others were young birds almost ready to fly. We selected a few sets of the finest that we could find and paid no further attention to them during the rest of the day. We were not out for such common game. It was only a few minutes after we had separated until I had found my first set of the warblers, and a shout from down the swamp told me that the doctor had also made a find. Mine was a set of six, a good starter, the nest in the cavity of a rotten snag about as high as my head, the female flying out almost in my face when I tapped on the trunk. In less than twenty minutes another set of five was found and a more distant shout from the doctor announced the fact that he also was in luck. The next nest was in a hole on the under side of a tree that had broken half off with the top end lying on the ground. This was a set of six. Every fifteen or twenty minutes a nest would be found until we came to the treeless district at the foot of Grass lake. The view here was a vast sea of flag and waterpepper, surrounding about thirty acres of open water. The whistling and chattering of the coots, gallinules and dabchicks, was to be

heard in every direction, but as it was not their nesting time for a month yet, we did not care to wade into this almost impenetrable cane-brake of flag and mud to seek for them.

Reversing our course we turned our faces back towards Thompson and searched on the other side of the slough. Quite a number of male red-wings followed us for some distance scolding severely for our intrusion in their haunts. In a dense thicket of yellow birch a nest of the wood thrush was found containing three fresh eggs Several more nests of the prothonotary were found and down near the lake a nest of the house wren containing seven finely marked eggs. At this end the lake is only about a quarter of a mile wide, but further down it widens to a full mile and it is five in length. It is a beautiful sheet of water and an ideal place for the collecting naturalist and in the proper season for the sportsman. During the migration of fall and spring thousands of pelicans, geese, ducks, and many other varities of water fowl, frequent these waters. Ex-President Harrison has spent one or two seasons here during the shooting season. The lake is full of game fish and in its waters are to be found some of the finest fresh water shells in the country. In the hundreds of acres of flag the coots, gallinules, rails, grebes and least bitterns, find suitable nesting places. The woodcock is a nester here, and I have taken the eggs of the hairy, downy, red-bellied, yellow-bellied and red-headed woodpeckers, while the great pileated may be seen in the bigger timber at almost any season of the year.

While the whip-poor-will usually prefers the uplands, I have several times found its eggs in this low country, and the cuckoos and night hawks are very common, as are several varieties of the vireos, warblers and the Baltimore oriole. A little farther back in the big timber the great horned and barred owls and the red-tailed and Cooper's hawk are common nesters. A busy doctor with almost every hour of his time demanded by the sick gets but little time to look after all these oological treasures.

Well, by and by we got back to our buggies and after a lunch of pie, cake and fruit, we sized up our finds for the afternoon. About twenty sets of the warblers, eight of the grackles, six of the red-wings, one of the wren and one set of four yellow-breasted cuckoos. The warblers were all sets of five and six, and upon the whole we were very well pleased with our four hour's work. The nests were invariably made of green moss taken from the roots of the willow trees, and in a few cases a little fine grass was used as a lining. The female was nearly always flushed from the cavity containing the nest and a minute afterwards would be joined by the male, who would be very loud and boisterous in his protests at our proceedings. In former excursions after these eggs I have nearly always had to seek for them in a boat, but this season on account of the low stage of the lake, it was dry land work.

The drive home was most charming. The forest gave one the idea of an enchanted land. An almost tangible atmosphere seemed to envelop the scene and to whisper a worldless language. The pale evening sky, through and beyond the massive tree trunks, as we left the swamp, resembled the broad expanse of a placid sea. Beyond the forest the open country suddenly bathed itself in sunlight, the pale sky breathed for a moment a rosy sweetness, then over all fell the vague shadows of the day's decline:

DR. W. S. STRODE, Lewiston, Ill.

Ohio State Academy of Science.

We are indebted to Mr. F. E. Masterman of Ohio, for some notes on the meeting of the Ohio Academy of Science held at Columbus, Ohio, on the 28th and 29th of last month. The sessions were held at Orton hall on the Ohio State University grounds. On

the morning of the 28th a short business meeting was held after which the program was opened. Some of the most interesting papers were as follows: "Additions to the list of Odonata of Ohio," by D. S. Kellicott; "Pileated Woodpecker in Ohio, Pickering's Hylodes in Ohio, and the Least Weasel in Ohio," by E. W. Vickers; "List of Liverworts of Cuyahoga, List of Plants New to Ohio, and Abnormalities in Plants," by Edo Claassen; "Ustilago heiliana and Distribution of the Green Ash in Ohio," by W. A. Kellerman; "Some additions to the Known Insect Fauna of Ohio," by F. M. Webster; "Notes on the Pleistocene Geology in the vicinity of Devil's Lake, Wis.," by J. A. Bownocker; "Notes on the Salt-marsh Plants of Northern Kansas," by J. H. Shaffner; "Science in the High Schools," by Miss Mary F. Law; "Science in the Country School," by E. E. Masterman; "A study of Cell Division in the Pine," by F. L. Fulmer; "Embryology of a Dicotyl," Miss L. E. Riddle, "Additions to the List of Plants of Ohio," E. L. Moseley; "A New Species of Fish from Ohio, a List of the Fishes of Franklin County, Ohio, and a List of the Crayfishes of Ohio," by R. C. Osburn and F. B. Williamson.

The president's address was given in the evening. The topic was "Does Modern Science Furnish an Adequate Philosophy of Human Life," by W. A. Kellerman.

Some of the papers presented on the 29th were as follows: "The Ohio River a Result of Glacial Conditions, and the evidence of an Ice-dam at Cincinnati," by Gerard Fowke; "Evidence as to the Origin of the Islands of Lake Erie," by E. L. Moseley; "Dynamical Modifications of Quartzite," by J. A. Bownocker; "The Junction of the Blue and Yellow Clays in the Drift of Northern Ohio," A. A. Wright, also "Recent Beaches at Sandusky Bay and Sodus Bay," by same author; "The Butterflies of Ohio," by J. S. Hine; "Some Sources of the Ohio Flora," A. D. Selby. "Revision of the Ohio Plants and Spermatophyta Rare or New to the Ohio Flora," by W. A. Kellerman; "Erratic Boulders in the Valley of the Rocky River," by Edo Claassen.

Mr. Masterman in his article on "Science in the Country School" exhibited a large number of specimens accumulated by himself and classes in that line of work. It was shown that the boys and girls are amply capable of comprehending and learning science when presented to them in a way that they can understand it. We hope to hear more about this subject in the near future from Mr. Masterman, who has had remarkable success in this line.

In the paper of Mr. E. L. Moseley on "The Evidence as to the Origin of the Islands of Lake Erie," it was shown that Lake Erie was formerly much lower than now. The islands formed a part of the main land. The lake had gone down below its present level and has now been rising for some centuries. The main evidence was that the flora and fauna include every species that is generally distributed on the main land, five hundred and sixty-six species of flora were found by the writer on six islands investigated.

Prof. Stephens of the Columbus North High School made some strong arguments for science in the High Schools. One of the main arguments was based on the need of attractive and interesting subjects to put a student at ease in his new surrougdings and tie him to the school. It is acknowledged that science is such a study. Mathematics develop the reasoning power, Latin gives dicipline, English helps the pupil to express his ideas properly. There is nothing to connect him with the world about him. A study to develop the powers of observation is needed and to interest the pupil.

The president's address was specially interesting and we regret that we cannot print it in full.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

Correspondence and items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

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The American *Archaeologist* now entering upon its second volume and year, promises to be much better (if that is possible) than in the past. It is doubtless the most copiously illustrated of the special magazines and the only one on this continent treating of prehistoric man which is of interest and written "down" to the average student. Published at Columbus, O., by the Landon Ptg. and Pub. Co., at $1.50 per year.

The California Geysers.

The remarkable hot springs, which are commonly called by the above name, are situated in the north-easterly part of Sonoma County, Calif., some twenty miles from the southern extremity of Clear Lake. The writer recently visited this spot, and so greatly enjoyed both the journey and scenery that he would fain induce hundreds of others to go and do likewise.

To reach the Geysers is not a difficult undertaking. We will suppose that you are in San Francisco and that you come to the ferry at half past seven in the morning. Step on board the large ferry-boat, take a comfortable seat on the upper deck and in a few moments the journey will begin. The whistle blows, the wheels revolve, the rudder directs the course of the boat to the north, and you are swiftly speeding past the city front with its crowded wharves and warehouses, and in a little time you are feeling the gentle swell which comes in through the golden gate. On past Alcatraz, with its ramparts and its guns, and you are soon skirting along the western side of Angel island. In a hollow which comes down to the water's edge is the military settlement and there may be seen barracks, officers' houses, and store buildings prettily grouped around a central park, while on the side of the hill stands a little church, nestling among the oaks, and above this may be seen the white stones and crosses which mark the last resting places of soldiers who have died in the service. The whole forms a very peaceful picture, though the subject is grim and warlike. A few minutes more brings you to Point Tiburon, where you leave the boat and take the train, and presently you are speeding along the San Francisco and North Pacific Railway. The road winds among the oak-dotted knolls where it can, and plunges through the very heart of the hills where it must, until it reaches the pretty town of San Rafael. Quite a long tunnel is necessary to let you out on the northern side, and then you glide along the edge of salt marshes, with here and there a turn behind low hills, till you reach Petaluma. Some of the land which you have just passed is as rich as any in the state, as the sleek herds of cattle and heavily laden orchards plainly testify.

And now you enter the broad Sonoma Valley, where level and productive fields spread out for miles on

either side; pause a moment at the county seat Santa Rosa, a thriving city in the midst of fertile plains, hasten past smaller towns, cross the Russian River below Healdsburgh, where it turns away to the west to seek the coast among forests of redwood, and following its western bank you come to the town of Cloverdale. You are now near the head of the valley, the green slopes of the mountains are close upon you on the west, and broken hills rise to the east. You have already passed in the distance the noble Saint Helena, and many lesser peaks belonging to the eastern range of mountains, but here the valley has become so narrow that you are not surprised to learn that for many years this was the terminus of the railroad. However, it has now been extended to Ukiah, the county seat of Mendocino County. Should you continue your excursion to that point, you would be amply repaid for the road winds along the bank of the river in the most romantic fashion. Now you can look down into the clear water and see speckled trout, now you pass under the boughs of giant oaks.

Again you are in the darkness of a tunnel, and in a moment look back on a high cliff, whose base the river has been assaulting for centuries. The valley broadens at length, and the rich fields are green with hop vines or covered with ripened grain or set with young fruit trees. A few miles beyond Ukiah the hills close in again, and you are at the source of the Russian River, while just across the divide are the brooks which flow northward and form some of the numerous branches of the Eel River, which empties into the ocean near Eureka. But this part of the journey, though interesting, is not essential to a visit to theGeysers. The stage for the springs leaves Cloverdale soon afternoon and makes the journey of 18 miles in three to four hours. You first cross the Russian River, and as you proceed to the hills you soon meet and ford one of its tributaries, the sulphur-tinctured Pluton. This stream comes down a great lateral valley from the eastern hills, and along the sides of this valley, first on the north and then on the south, has been constructed the stage toll road. It would be hard to find a wilder or more beautiful road in any of the valleys of California. The curves are innumerable, the precipitous descents which it barely but safely avoids are sufficient to stir the blood of the boldest, while the grand old trees, oak, maple, and laurel, are majestic and inspiring. Especially as one is coming down the valley in the cool of the morning does the view seem superb. Were there no wonders beyond to be seen, the ride up and down the Pluin gorge is well worth the moderate price which is asked. But at length you smell sulphur and know you are near the end of your journey. The hotel is before you, a series of low but comfortable buildings in the midst of fine old trees, and on the other side of the brook you get a glimpse of columns of steam ascending from unknown sources. You are anxious to explore at once, but are advised to wait until the early morning; meanwhile, you can visit the commodious bath-house and refresh yourself with a bath of steam "hot from Tartarus" and a swim in a tank of lukewarm mineral water, heated in nature's own kettle.

The next morning you are up before the sun, and taking a basket of breakfast on your arm you set out to explore the mysterious canyon. At various intervals along your path are springs of cold or warm water, each one having its own peculiar taste according to the nature of the minerals which are held in solution. Sulphur compounds, soda and alum, with salts of iron and magnesium are the principal ingredients. From some of the springs the beverage is so hot that you must cool it before putting to your lips. and in general you are satisfied to sample the water rather gingerly.

The product of one spring is called "hot lemonade" and it flows forth in a copious stream from the subterranean mixing bowl. You acknowledge the "hot" but are inclined after a trial to discredit the appropriateness of the latter name. You prefer the somewhat more technical term "An acidulated solution of the double sulphate of aluminum and potassium." However, some people love to drink it. Hot springs and steaming banks abound over quite a large region, but the largest and most violent manifestations are found in the bed of a side canyon, which comes down from the north to Pluton River. It is a deep V shaped gorge almost devoid of vegtation, and its steep walls are covered with masses of mineral matter, mostly of brownish yellow color, though varying in hue from white to jet black. Along the bottom tumbles a stream of hot water, which receives accessions from each new spring. Various small hot springs attract your attention as you enter the canyon, but your interest centers in the "witches' caldroun" about half way up the gulch. This is a basin about some 20 seet square, partly filled with rocks and showing different degrees of activity on two of its sides. Next to the path it is moderately quiet, but near the bank it is in most violent commotion. A huge column of steam continually ascends from the surface somewhat obscuring the view, but as the wind shifts it a little, you get a view of the water, jumping, boiling, foaming, lashing, while from a cleft in the rocks, at brief intervals spurts out a fountain of hot spray, which salls into and is mixed with the seething waters below.

The points of interest are numerous; one wishes to spend hours in examining these remarkable phenomena. Here is a kind of oven opening into the hill; you listen, and from within you hear the hoarse gurgle and groan of the imprisoned steam. Here it comes whizzing out from beneath a rock, reminding you of the safety valve of a locomotive; there on the bank is a gentle steaming cleft, and around the outlet are the most delicate needle shaped crystals or sulphur arranged like frost work on a cold pane. In the water of one spring is a black, inky mud; in another are layers of rich brown, pink and purple, while a bright green water moss seems to thrive in the warm flow, and forms another color in the mass of brilliant tints. Here are leaves of delicate, showy crystals of Epsom salts, there are coatings of green copperas, and all about you are suggestions for a wondrously beautiful and harmonious carpet.

Farther up the hill you find cool, shady trees, where you are glad to stop and rest, and then if you are disposed you can climb the mountains and look off on the blue waters of Clear Lake. On your return to Cloverdale, you pass several bands of campers, who have pitched their tents near the river, and you commend their wisdom in selecting so romantic and attractive a spot. Deer are on the hills, trout in the streams, cool waters, and shady streams abound, and the peace of nature is over all.

From a scientific point of view, the Geysers of California are of great interest. To some they suggest the heated condition of the interior of the earth, but the irresistible conclusion which comes to the mind of one who studies all the phenomena, is that the heat is caused by the decomposition of immense quantities of sulpherets contained in the surrounding and underlying rocks, and that the various minerals with which the waters are charged are the results of the varied and extensive chemical changes which are constantly taking place.

Lafayette's Museum Burned.

Pardee hall, erected for the scientific department of Lafayette College, Easton, Pa., was visited by a very disastrous fire early on Saturday morning, Dec. 18th.

The hall consisted of one central building, five stories in height, fifty-three feet front and eighty three feet deep with two lateral wings, one on each side, each sixty-one feet long and thirty-one feet wide, four stories in height, including a mansard roof, the whole terminating in two cross wings, each forty-two feet front and eighty-four feet deep, and four stories high. The entire length of the building was two hundred and fifty-six feet. It was built of Trenton brown stone with Ohio sand stone trimmings. It was heated throughout by steam and lighted by gas.

The fire originated in the biological laboratory on the second floor of the west wing. This is the second time the building has suffered through fire.

Pardee hall, the magnificent gift of Ario Pardee, was erected in 1873 but was destroyed June 4, 1879. It was immediately rebuilt on the same dimensions and external appearance as the original with the money realized from insurance and donations and was reopened on November 30, 1880, with imposing ceremonies. There were in attendance Rutherford B. Hayes, then president of the United States, together with Hon. Alex. Ramsey, Secretary of War; Hon. Horace Maynard, Postmaster General; Gen. W. T. Sherman; Hon. John Jameson, Superintendent of Railway Mail Service; Hon. John Eaton, U. S. Commissioner of Education; President Gilman of John Hopkins University; Governor of Pennsylvania and many other distinguished persons.

The Ward library was located in the west lateral wing and consisted of 10,000 volumes. Among its treasures were books which dated back to 1520. It contained autograph letters, maps, engravings and many rare and valuable books such as "Raleigh's History of the World," "America, an Accurate Description of the New World," and the "Cromwelliana," containing a number of old portraits and facsimiles of the historical records relating to the times of Cromwell This entire library was destroyed. It was valued at $20,000. The Washington Society library consisting of 4,000 books was also destroyed.

The following collections were totally destroyed: The mineral collection of the late Prof. Silliman and one made in the Rocky Mountains by S. J. Coffin; the Asiatic collection of the late Rev. Elias R. Beadle, costing $5,000 and donated by the late Wm. H. Kemble of Philadelphia; the Lopsius Egyptian monument collection valued at $2.000, and other natural history objects.

It was at first surmised that the entire herbarium of Rev. Dr. T. C. Potter, professor emeritus of geology and botany, was also destroyed but it has since been found that his collection of Penna flora, the most valuable in extent, has been saved, and of the North American flora only about one third has been lost.

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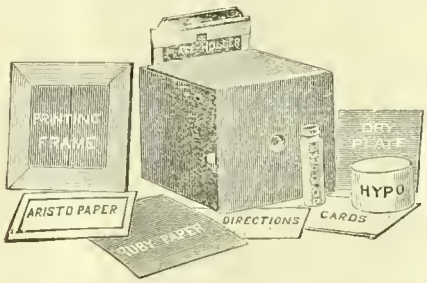

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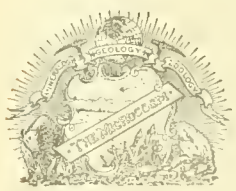

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SHELL COLLECTORS.—We intend to greatly enlarge our stock the coming winter and make many exchanges with collectors. Please send us a list of any Land, Fresh-water or Marine Shells you have to offer. We want Helix as ever and wish all collectors who have any duplicate Helix to send us complete lists. Any one knowing of any large shell collections for sale will confer a favor by advising us of same. W. F. WEBB, Mgr., Albion, N. Y.

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OFFER NO. 2—10 fine Indian Arrow Points, $1. 10 fine mineral specimens, 75c; opal, gold, silver, copper, iron and lead ore, agate, gypsum geode crystals, satin spar, all good size; and our "Starter Mineral Collection" of 24 specimens for only $1, prepaid.

OFFER NO. 3—Fine showy shells, pair of large angel wings, 75; black murex, 50c; red murex, 50c; black ear shell, 15c and 12 others such as chiton, owl, conch, tulip, etc., for $1, prepaid.

OFFER NO. 4—Two nicely mounted birds, our selection, value $1.25 each, sent prepaid, $1.

OFFER NO. 5—Corals, brain, branch, finger, worm, rose, red, pink; retail price, $1.75, and our marine souvenir of painting sea mosses and shells, prepaid for $1.

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FEBRUARY, 1898.

THE MUSEUM

A Journal Devoted to Research in Natural Science.

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THE MUSEUM.

WANTS, EXCHANGES AND FOR SALES.

All notices that come under above will be inserted in this department until further notice at one (1) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

WAMPUM!! assorted from ancient graves in Cayuga, Co., N. Y., rare, 1 doz. 60 cents, 2 doz. $1. Colored beads from same graves, 1 doz. 30 cts., 2 doz. 50 cts. LEE ROY J. TAPPAN, Newark Valley, Tioga Co., N. Y.

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WANTED.—Perfect butterflies in papers from Western and North Western States. Offer fine exotic specimens for same. Also offer fine 5x8 camera. LEVI W. MENGEL, Reading, Pa.

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I WISH to correspond with parties who can collect for me river clam shells in large quantities during the coming summer, especially fine varities. K. B. MATHES, De Funiak Springs, Fla.

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WANTED: — Structural and systematic conchology by George W. Tryon, Jr , cheap edition, state condition and price. CHAS S. HODGSON, Albion, Ill.

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TO EXCHANGE:—32 calibre double action revolver, several volumes Smithsonian (museum) reports, cloth, new, back numbers of Oölogist, Dana's Geology, cloth, 500 Youth's Companions, 3 vol. American Bee Journal bound, tennis goods, etc., want W. T. Hornaday's taxidermy, instruments, and eggs in sets, eggs of sea birds and birds of prey especially desired. Correspondence solicited W. A. TRUE, Cumberland Centre, Maine.

WOULD SAY my adds in your paper have brought me good returns, and I shall still continue to use its columns. Would recommend it to every live naturalist. CHRIS FORGE. Carman. Man.

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WANTED to dispose of our stock of Fossils. Will sell cheap for cash or exchange for fine Indian relics. W. F. WEBB, Mgr, Albion, N. Y.

THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., FEBRUARY 15, 1898. No. 4

A Study in Archaeology.

Seeing in the December number of MUSEUM, the article entitled "An Aboriginal Village Site," has aroused in me a desire to hear still more on the subject, and to help matters along will donate a few stray thoughts from my corner of the plantation, while yet the memory of the above mentioned article is fresh in our minds.

I shall endeavor only to give the reader, in plain descriptive, the results of a little personal observation and research in regard to pre-historic habitations in my locality.

We have read many accounts of the more gigantic archaeological monuments to an extinct race of men as seen in the mounds found in the eastern and central states, but thus far the more western have been somewhat neglected, though not because there are no fruitful fields here; for there lies in Kansas many an acre of soil, rich in its history of bygone days of savagery, though unmarked in many cases, save by a few broken points and the shavings from their work-shops—the flint clippings, flakes and unfinished implements thrown aside by the artisan because of a flaw in the material or stubbornness of the flint in clipping. These and many other evidences, noted only by the experienced eye, show us that ages ago Kansas has nursed upon her heaving breast a family of children, who, though rude in methods and warlike in disposition, had hands as skilled in their arts, hearts as brave, a love as fervent and patriotism as loyal to the dear old hills and prairies and doubtless more so—than her present generation.

That such have been the facts, written history and traditions tell us, and a still more tangible and undoubted evidence to the truth may be found within a league of almost any of our homes if we but look for them.

Especially numerous will be the proofs along the valleys of our streams where, long before our eyes beheld the light of day or gloom of darkness; and when yet the rocks with which our homes are built, were fresh in their beds, our brother—the Indian, mound-builder, cliff dweller, or whatever vague term we may use in speaking of him—was studying the laws of resistance and how to construct his missiles of death so as to be least retarded by them, as shown in the various and novel shapes, in which, with patience he formed the flinty tips for the arrow and blade for his spear, how he rearched among mother earth's treasure store for the material most suitable to his purpose, and at the same time with an eye for beauty in form, color and symmetry, also seen in the apparently insignificant scraps, which he carelessly left behind. How he worshipped the Supreme, as seen in the location of his temples and altars, probably now a mere shapeless mass of dirt and partially burnt stones, pillars or mounds of earth, fast being scattered and obliterated by careless hands and plowmen

The thought must come to one in a moment of reflection, "Will the day come, when in the years that are still in oblivion of the future, man shall have become so far superior in intellect and methods, and yet know and think as little of us as we now know of our ancestral race; that he must look upon a few of the more lasting and least destructible of our works of civilization and say, alas! 'how crude were his works!'" and yet with all his civi-

lized superiority be able to tell so little of our character.

Now to return to our subject, let me invite you to my home on the Walnut river (really only a small stream at present) and take a stroll across its valley to what appears to be a hill of about 150 feet in height at this point on the east side of the valley. Climbing its side which is rather steep we find when we reach the top that it is no hill at all but that we have just reached the level of the surrounding country and see that the prairie recedes gently from us while at our feet the valley and its smaller tributaries are but wrinkles on the face of the expansive country, having at some previous age been formed by erosion, and looking across the valley, a distance of from one-half to two miles, we see the opposite bank of what was once a mighty river (whose depth was somewhat greater than that of the present stream) the bottom was what we now behold to be the choicest of farms lying so snugly and beautifully within these walls, with the narrow, timber-fringed Walnut, like a thread of silver winding peacefully among them.

It is upon these higher terraces that the roughest and apparently more ancient implements are found, and as yet, know of none having been found on the lower terraces, while it quite frequently happens that the later ones are found upon the highest terraces, even on the same site where the oldest are found.

Water being a factor in establishing a camp, we usually find that where the later and finer types of arrow points, etc., are found on the higher ground or terraces a spring usually bubbles forth (or did at that time) from the foot of the hill. The query with me has always been, "Why not camp on the ground on the level of the spring?" Possibly they took the hill top to avoid risk from floods in the valley, to guard against enemies' surprises, or for the exhiliration of a more lofty position.

With but one exception the village sites found in my searches during the past summer and fall, are on the terraces. This one is in the bottom, on the bank of the present stream, being about 15 feet above "low water" mark, is in a corn field, and although mant times upturned, yet on a plot of about an acre the ground is thickly strewn with flint clippings among which is an occasional arrow head or fragement.

The points which I believe to be the oldest are thick, roughly chipped and rather oval in shape, showing a discoloration on the surface. Those of later make become more shapely, having a finer point with notched or stemmed hilts. Later still and those found on this last mentioned site, they are real thin and beautifully regular in ouiline, and of many styles. The handful of flakes gathered up promiscuously will show more of a variety in color and quality of flint than those on higher ground, these splitting off in thin spauls, showing either more skill in making or a better quality of flint.

As to the age of even the later make, I shall not attempt to guess, but leave that to wiser heads, but they are beyond the recollection of even the earliest settlers here.

I must mention also that besides arrow and spear points, which are most numerous of all, I have also found a few scrapers, one of exceptionally fine workmanship, of black flint and one of brown. One fragment of a beveled edge point of gray flint, also an arrow head having a decided curve flat-wise, as if used to shoot in a curve or in some trick-shooting. Upon two of these hill sites are found a heap of crumbled stone and earth, the stones showing a burnt surface on one side, indicating an altar or fire-place. At other places what appears to be a grave, though I have never proven that but expect some day to do so.

At one place upon a knoll down in the valley are found a number of broken arrowheads and all are the *point* halves, and no clippings are found. Will we not conclude from this fact that we have discovered a battle ground where the clash of flint, the war whoop and the feather were closely commingled in some deadly affray.

W. W. SHELLEY,
Eldorado, Kan.

Death of Samuel A. Miller.

AUTHOR OF NORTH AMERICAN GEOLOGY AND PALEONTOLOGY AND OTHER SCIENTIFIC WORKS.

On the 18th of December, 1897, Samuel A. Miller, of Cincinnati, Ohio, succumbed to that fatal and dread disease, cancer of the liver, with which he was stricken about three weeks previously. He was born at Coolville, Athens county, Ohio, August 28, 1837. He was a graduate of the Ohio University, and of the Cincinnati Law School, and was admitted to the bar by the District Court of Hamilton county, in April, 1860, and since his admission to the bar had practiced continuously, with the exception of a short time in 1861-62, when he edited a weekly paper in Marietta.

Mr. Miller was one of the founders of the Society of Natural History, and for several years edited the "Journal" which is the official organ of that scientific body; also edited and published the "Cincinnati Quarterly Journal of Science" in 1874-75. Mr. Miller attained his greatest success, however, as a scientist of the highest order, and his works on geology and paleontology will abundantly prove to the world that he was truly one of the few master-minds of this branch of science. He was the author of "Mesozoic and Caenozoic Geology and Palaeontology," "The American Palaeozoic Fossils," and "North American Geology and Palaeontology," to which work he later added two appendices. He had in preparation "A Monograph on the Cephalopoda," the manuscript of which was nearly finished at the time he was taken ill.

He was a member of the Geological Commission of five states, Ohio, Indiana, Missouri, Illinois and Wisconsin, and the reports submitted by them were largely the result of his work. He has a record of describing more crinoids than all geologists together, and is also the discoverer of a system by which they can easily be distinguished, and which is so highly thought of that it has been adopted as the standard authority both in Europe and America. His collection of fossils is considered one of the most complete in the world, and any connoisseur of this science has only to view his specimens to be convinced of their true value.

Mr. Miller was a hard student. His love for geological knowledge never seemed to wane, as he was up early and late that he might be able to further this one great pleasure of his life. It is admitted by learned professors that his works on geology have never been equalled by any one.

The collection of fossils owned by Mr. Miller is considsred the largest private collection in the United States, and its value is greatly increased owing to the large number of "type" species that it contains and by the correct nomenclature and classification of each specimen. His scientific library contains several thousand volumes, and embraces works of the highest authority on Geology, Palaeontology, Mineralogy and other scientific subjects.

The degree of Ph. D. was conferred upon him by the Ohio University in 1893, in recognition of his ability. He was an honorary member of many scientific societies in different parts of the world.

Mr. Miller was a man who very much disliked ostentation, and this fact was still more thoroughly impressed upon those who witnessed the last sad rites of their honored and es-

teemed friend, as they listened to the funeral oration delivered by Mr. Thomas Vickers, one of his nearest friends, who had promised to act the part that Mark Antony had done toward his dear friend Cæsar.

Mr. Vickers feelingly responded as follows:

Dear Friends: There is no one of us who does not feel that all words are inadequate on an occasion like this, whether their object be consolation or the expression of one's appreciation of the worth of a friend. And yet I could not refuse to say a word of leave-taking at the departure of one whom I have known so long. It was his own request often repeated that I should do so.

I can not think that it troubled our friend how most men would speak of him, when he himself had become silent. He was a man singularly self-poised and self-centered in a noble sense, and yet kind and true, and a strong lover of his friends. So that, on the other hand, I can well imagine him wishing that the sympathetic voice of a friend might be heard at his bier. Our friendship began not in private interest, but in a desire for public good and a common love of knowledge; thus it has survived many changes and long absences, notwithstanding wide diversities of taste and work.

He was not a man who followed beaten paths; for he well knew that they are the really dangerous ones to him who is in pursuit of truth. It was said of old that "we perish by other men's examples." It is always easier to follow than to lead He did not choose the easy way. He cared nothing for the toil and the difficulty. He preferred to scale the heights and view the prospect himself, rather than depend upon the report of others. He was a born investigator, a man of critical and judicial mind, which yielded assent only to personal conviction. He was essentially a man of sound understanding; of strong and massive individuality; faithful to his own best thought; but not narrow, intolerant or exclusive. A man himself, marked and powerful, he respected manhood in others, and did not insist that they should traverse life's ocean according to the chart which he had constructed for himself. Thus he was broad in his sympathies, and catholic in spirit. Capable of intense feeling, especially when aroused by a sense of wrong or injustice, he was nevertheless gentle and companionable as a child.

He had the indominable resolution of a fearless mind, and the serene and cheerful disposition that comes from faith in honest work. He was simple-hearted, and of simple habits, with a supreme contempt for sham and pretension. He was utterly devoid of ostentation; a man of luminous intellect, but with no desire to shine, and wholly indifferent to the plaudits of the thoughtless multitude. He was superior to all low ambitions, and therefore free from all the cares that attend them. The love of office had no seductions for him, and so he never departed from the path of rectitude to obtain one. I have known no man who would have had a better right to apply to himself the grand words of Seneca: "I will live and die with this testimony—that I loved good studies and a good conscience, that I never invaded another man's library, and that I preserved my own."

I have known the man whose earthly form lies before us intimately for almost 30 years, and have discussed with him many things of more than passing interest; but I do not know what he thought of those things which many regard as the only real problems of life and death. Nor was I curious to inquire. I know that he agreed with all good men everywhere that virtue does not dwell upon the tip of the tongue, but in the temple of a pure heart. I know that he valued himself most upon his conscience, upon his integrity as a man, upon his constancy as a friend, and his honor as a citizen.

What he was, he was to the heart's core. Without a trace of affectation. We shall presently commit his body to the earth, and shall see him no more until we are changed as he has been, but these are virtues that cannot die. an immortal glory surrounds them: they will shine like stars in our memory, and be a help and an inspiration when our spirits falter and our courage is like to fail. It was said of Cato that "people never knew the value of him until they lost him." So it will be for many with our friend.

It is not for me, nor is this the place, to speak of Samuel Miller as a lawyer or a man of science. Others more competent than I will do that on the fit occasion. Perhaps it will not be altogether easy for some to understand how tendencies apparently so radically opposite as those manifest in the successful pursuit of both law and science could be united in a single man—a profound interest in what is based mainly on custom, tradition, expediency on the one hand; and in that which seems absolute, fixed and invariable on the other. But I have no doubt that he found the "spiritual nexus" in the fact that amid all the fluctuations of legal enactments and opinion there are eternal principles analogous to the laws that govern the material universe, and that the historical evolution of justice is not less real and not less certain than the evolution of the vegetable and animal world

"Alas, that unexpected guest,
Who waits for no man's leisure, has stept in,
Unasked and unannounced, to put a stop
To all occupations and designs."

The powers of physical endurance were exhausted—our friend lies low. The golden bowl is broken, but who shall say that the silver cord which bound our hearts together has been snapped asunder? The lawyer has laid down his law books, the geologist has dropped his hammer, the author his pen: but who shall say that the thinker has ceased to think because the brain is still? that the affections of the husband, the father, the brother and the friend are dead, because the heart has ceased to beat? For one, I do not, I can not believe it. We prize so much the beaming eye, the loving touch, the accustomed voice, that when they are gone we are stricken with a sense of absolute loss. But though we relinquish this outward, visible form, the man will remain—a priceless possession in the memories of all who loved him. He, like so many who are dear to us, has only preceded us to the silent land—silent now, but one day, I fondly hope and trust, to become vocal to us with the heavenly greetings of those who have gone before.

Death has one indisputable lesson for all—an old one: "We ought to cherish our friends tenderly, because we know not whether they are to abide with us a long time or not." Let us, therefore, cherish them as if we were to lose them, and when we have lost them, cherish them still.

The deepest lesson of our friend's life as of the lives of so many who do not know how to utter the other men's shibboleths, is contained in—

"The simple thought
By the great Master taught;
Not he that repeateth the name,
But he that doeth the will."

This is the everlasting gospel.

Farewell, dear friend! Rest, weary body, from thy labors! Rise, immortal spirit, into the greater and diviner life."

The monument that marks the last resting place of this most noted geologist seems peculiarly appropriate. The base is a large section of dressed and beveled New Hampshire granite. Upon this is mounted a pedestal of the same material highly polished. This is surmounted by a log of fossilized wood, four feet in length and three and one half feet in diameter, obtained by Mr. Miller himself from the "Petrified Forests" of Arizona, which he visited in

1893. This log rests on its side, and the ends, which are highly polished, are translucent, and the many colors and delicate tints which this chalcedony assumes are blended into a most beautiful effect.

Science in the Country School.

SYNOPSIS OF A PAPER READ BEFORE THE OHIO STATE ACADEMY OF SCIENCE, BY ELMER E. MASTERMAN OF NEW LONDON, O.

I have always claimed that science could be taught in the country schools, in fact any school with profit. For several years I attempted to teach science in the country school so far as opportunities permitted and with marked success.

We have in the country boys and girls capable of comprehending and learning science if presented to them in a way that they can understand it.

We certainly have enough material with which to work:—Insects, Reptiles, Fish, Birds, Mammals, Plants, local archiology and geology, etc.

Could the Universities, Colleges, Academies, high and intermediate schools have some of the material that the country can have access to, and could the country pupils only have teachers capable and willing to teach the science in connection with other studies, both would be greatly benefitted. There would be less time to study mischief and less desire to do so. Could this be done, I believe there would be less need for jails, reformatories, penitentaries, almshouses, asylums etc.

We in the country, and no doubt city schools also, are too often hampered for want of apparatus with which to work. When we can not get these things from school boards, we get them ourselves and make them as best our time and opportunities permits, and it is surprising what can be done by an enthusiastic teacher and a few energetic pupils. I speak personally now. We have a small telescope, 2¼ inch aperture mostly home made, several small microscopes also of our construction, several pieces of electrical apparatus, an air pump that will exhaust the mercurial column to two inches We have a B. and L. microscope and some accessonics, costing $75: We have a small mixed collection of 2,600 specimens of Minerals, Fossils, Shells, Fish, Birds, Plants, Sea life, archiological specimens, &c., a small library of 700 books and pamphlets, besides 1,800 photos and half-tone pictures from the world at large, these with some university training and the experience of 194 days of sight seeing at the World's Fair, gives us a little advantage over the most of teachers.

We do not teach science as a separate study but in connection with mathematics, physiology, geography, etc. By looking ahead at tomorrow's lesson we have something to illustrate the lesson better.

Let me give you an instant or two. Let children see circulation of blood in a frogs foot, the action of the heart in the snapping turtle just killed, the brain of a cat takes the place of human brains, ox eyes explain the eye better than pictures, the ball and socket joint of the shoulder of a cat is better than drawings, the sutures of the skull of a cat are plainly visible, &c indefinitely. The good resulting is very great. Rarely poor lessons, no tardiness, little need for rules usually found in schools, become better acquainted with nature, seeing what we knew not of before, making school life a pleasure where to many it was but drudgery. Learn to know the harmful insects, plants, animals, etc., from the harmless, destroy or shun the one and protect the other. When reading we better understand what is meant and respect ourselves the more for it, broadening our intellect and reason.

Pupils thus trained find less diffiulty

in passing the Boxwell (in Ohio, or teacher's examinations, and teachers find little difficulty in retaining the same school year after year so long as they desire to teach in one place. Nor do we stop here, things practical are necessary. Business science, the filling out of all blank business forms and papers likely to fall into the hands of the ordinary people, checks, drafts, mortgages, deeds, bonds, policies, petitions to societies, &c., actual work parliamentary drills, Australian elections, hospital work—making bandages, use of lineaments, splints, vaselenes, arnica, camphor, doing up broken limbs temporarily, stop bleeding, fainting, burns, etc.—actual drills. *It's necessary* to know these things. Perhaps I am wrong, but I don't think much of the memory of dates in history, history of wars, etc. Let's have civics, history of U S, and State Constitutions, Rights of people, etc. something that is going to do some good.

"Do you get extra pay for such work?" you ask. "Yes." Not in money, however, but our friends? consult lawyers, write to school boards, the school commissioners, to have such work stopped. Our scholars don't however. We pay no attention to these things: I have heard it said that barking dogs never or seldom bite. So long as the barking is going on we are not afraid of being bitten.

We have presented a few specimens of our collecting and some we used to the Ohio State University to show what can be done by children. Most children are not slow to see if shown when, where and how to see.

We are accused of making murderers, robbers and criminals in general. None of our pupils have ever been condemned to be hung, electrocuted or to jail, but we can point with pride to teachers, scholars and solid, substantial men and women having good homes and families and all of them practical AMERICAN CITIZENS.

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Mitchell's Cave.

P. M. VAN EPPS.

II.

Balked in our attempt to penetrate the Grand Rotunda we set out for our return to the upper world and at once met with a series of unpleasant incidents. While yet in the chaotic passage it was noticed that the air began to thicken and grow heavy with smoke. This was decidedly unpleasant so we hurried over the rocky way. However the air grew heavier with smoke and noxious fumes from the fireworks used until breathing began to be a painful act, and each could just discern the blaze of the torch in his own hand. Arriving at the descent into the House of Goliath, one of our party of five, Van Vranken, must needs go flying head foremost down the rough descent thereby getting severely bruised and receiving a scar which he will carry through life. This place

was worse than the last as the smoke-laden air was still thicker, the chamber being at a lower level. This was alarming and we all now realized that we must hasten onward and quickly attain a higher level or we should suffocate.

Had the way before us been other than straight, had there been a maze of side-passages to bewilder and confuse us, we would have had considerable trouble in keeping the right path. But soon we worked our way to an upper level where we happily found but little smoke and were able to again breathe in comfort.

Here a new difficulty confronted us. We were positively unable for some little time to find the way out. Though two of our party had been through the cave before yet we were all "at sea" for a few minutes. Some retracing the path others vainly trying the passage ahead. Another tried to insert himself into a narrow crevice in the floor of the passage, thinking no doubt we had through some mistake taken a higher level than we ought. But folly! "Hitch your wagon to a star." Why did we not look up? Right over our heads, far up, lay the pathway. We were just below the difficult path. In fact we were in Martin Carson's "Bottomless Pit." From here upward and onward we had no difficulty. A fine moral could easily be taken from this latter incident.

The odd phenomenon noted,—the unusual settling of the smoke and fumes in the lower depths of the cavern, may have been caused by the peculiar configuration of the walls of that portion of the cavern; comparitively narrow yet the cleft extends upward to a great height. This particular shape of the opening, coupled possibly with an absence of active circulation there, may help to explain the matter. A like occurrence I had never noticed before, nor have I read of any similar case.

Mitchell's Cave possesses a mild mystery in the way of a vanishing portal, an elusive rock-hole. "Now you see it; now you don't." A number of explorers have told of a certain mysterious round hole existing in the floor of one of the chambers, an opening leading to unknown depths of the cave.

"Where the footsteps of mortal never trod."

Those who have seen it describe it as being a nearly round hole in the floor at the end of small chamber; a round hole like that in an old-time well-stone, but not quite large enough to admit a person. The thickness of the rock floor at the aperture is said to be about 12 inches. The depth of the opening below is unknown but is estimated to be considerable judging from the sound given back by stones dropped into it. One explorer writes of it thus,—"It seems as if it were an opening through the ceiling of a large room. The distance to the lower floor estimated at from 40 to 100 feet, or more. The room below seems to be of very large size." There has been considerable speculation as to what wonders might be revealed could this opening be enlarged sufficiently to permit access to the unknown chambers below. Various ways have been suggested of accomplishing this. Some have planned to use dynamite. Others have proposed chipping the hole to a larger diameter by means of a heavy stone-hammer. At our visit, in 1896, we carried hammers, drill, powder and fuse, etc., hoping to enlarge the opening by drilling near its margin and blowing out a section. To our disappointment we were entirely unable to find the place at all although two of our party of five, Hartley and Van Horne, had visited the cave before on different occasions and each had both seen and remembered it well.

It is possible that, within the past few years, there has been some fall of rock in the cleft concealing or closing this opening, for Van Horne, who was much chagrined over our failure to find the mystery, has made another attempt

this winter (Dec. 31, 1897) but with failure as before. Under date Jan. 3, 1898, he writes me of the matter as follows: "I did not write you before because I had determined to visit the cave first,—to see if it could be explored to the end, and open the hole in the rock. * * * I did not go until Friday, the 31st. A friend accompanied me. We went fully prepared; had five dynamite cartridges, 100 feet of fuse, small oil-stove (to warm dynamite), etc. Reached the cave at 11 a. m., and left it at 3:30 p. m. Don't think any one had been there since we visited it a year ago. We found the cave very muddy and our outer clothing was completely soaked with water and mud. In one of the rooms was a pool of water about 10 feet in length and about two feet deep. We managed to get across and reached the room where Hartley sent up the rockets, but could not go any farther. The tunnel that leads to the Rotunda was filled with water. We looked in vain for the rock-hole, so we lugged dynamite and stove through the cave for nothing. We found numerous colonies of bats clinging to the walls in clusters, and water dripping from the roof. I send you three specimens that are peculiar, have never found any like them before. The small stalactite shaped like a trumpet came from the level horizontal roof. The other two specimens I found together in a small pool of water. Query! How were these bars and pellets formed, and why not all of one shape? I found numerous specimens of each kind. When we reached Mother Earth it was snowing fast and we had to face the storm all the way home, nearly 8 miles. Don't think I will explore any more caves in winter."

The winter season has been recommended as the best time of the year for cavern exploration and this may be true in a general way. However, Mitchell's cave is an exceptional case, the vertical cleft readily admitting the surface waters which trickling through the enclosed detritus keep the walls of the cleft constantly wet, clammy and unpleasant to pass. With the true caves of a limestone region it is different. The roof of such generally being quite solid rock any entering waters are compelled to follow the same conduits at all seasons.

The specimens from Mitchell's, spoken of in the foregoing letter of Mr. Van Horne's, are very interesting examples from the many forms of growth made by calcareous deposits in the underworld. The "pellets" are known as "cave-pearls" and have been slowly formed by calcareous growth around a grain of sand or other minute object as a nucleus. Quoting Ernest Ingersoll, ("The Caverns of Luray"),—"They lie, three or four together, in little hollows in the floor, exactly like so many eggs in a sparrow's nest. Every falling drop moves the grain and prevents its becoming attached or growing into any except a globular form; thus under proper circumstances, marbles or 'pearls' are formed."

The cylinder or "bar," spoken of by Mr. Van Horne, of which a sketch is given, had its origin much the same way as the cave-pearls. These cylindrical forms of calcite have for their nucleus some small object such as a tiny twig, a splinter of wood, a pine needle or even a hair, any of which could easily be conveyed into a cavern by water. The length of the nucleus of course determining that of the cylinder. The example figured was fortunately broken in the mails; probably with a blow from the dating stamp. This break has opportunely shown in a curious way the internal structure of the specimen.

By gently pulling the ends the cylinder can be separated slightly as shown in the cut which is a little more than natural size. The shorter portion sliding freely for a trifling distance on the enclosed nucleus which is thereby plainly shown. However, the end cannot be removed farther without

danger of further breaking the specimen, so the exact nature of the nucleus cannot be determined. But it is seen to be light-colored, somewhat translucent; is slightly pliant and resembles a stout bristle.

Mr. Van Horne has since experimented on another of these cylindrical bodies from Mitchell's and found its nucleus a tiny twig, very brittle, unlike the pliant nucleus of the example figured. These calcite cylinders have been formed in like manner with the cave-pearls. Water charged with lime falls drop by drop upon the tiny nucleus causing it to turn in its bed as its coating of spar grows larger and thicker thus slowly building up a deposit of uniform thickness from the center outwards. The result is a cylindrical body with neatly rounded ends whose length slightly exceeds that of its nucleus. The exterior of the specimen figured is of a wax-like whiteness and bears a beautiful polish.

The next and last object to be described in this connection is the peculiar trumpet or pipe-shaped stalactite of which a figure is shown. It was procured by Mr. Van Horne from a level, horizontal roof of the cave.

This odd-shaped pendant has been undoubtedly thus formed by a strong current of air swerving the trickling drops of water far to one side. It has a history of its own, as well as a prospective name, and should not be confounded with the helictites, which are twig-like lateral projections of calcium carbonate formed by a capillary movement of the lime-charged water and of which examples have been noticed in Mitchell's Cave.

At the entrance to nearly all caverns of any considerable size a noticeable current of air can be felt blowing from the interior of the cave. Especially is this true in the summer season. In the winter time the process is reversed a current of cold air drawing inwards. This has been found true with some very few exceptions. Certain caves in Kentucky, among them Salt's Cave, discharge a constant blast of air the year round. But it is not with those portal blasts that we have to deal in accounting for our curiously-bent stalactite.

In the interior of our larger caverns a perfect calm apparently reigns supreme. Nevertheless a quiet circulation of air between the different levels of the cave is continually taking place, and now and then we shall find a situation where, by reason of certain peculiar forms of the chambers and passages, a very strong current is passing. Certain constricted portions of a passage may even give rise to a powerful blast which may be a constant feature of such a situation during several months of the year.

A long and exceedingly crooked passage leading laterally from the main avenue of a well-known cave at the Helderberg Mountains ends in a neat *cul-de-sac*. Here we find an opening of about eight inches in diameter from which issues a blast almost like that from a blacksmith's bellows.* Given such conditions, they can occasionally be found—a moderate blast and the proper distillation of lime-charged water, and we have all the necessary conditions for the formation of just such oddities in calcite as that figured and for which I shall propose the name "blasanite," from the Anglo-Saxon "blæsan" to blow. I am fully aware that in this term, being a compound from two tongues, I have presented a barbarism according to strict scientific nomenclature, but I contend it is fit for the object to which applied, and otherwise far better than some of the uncouth jaw-twisting Helenic derivatives in use.

No records of any actual measurements of the vertical depth of Mitch-

* This curious phenomenon can only be explained by suggesting that here exists a point of communication between the known cave and some greater unknown and unexplored portion. Or that it is a channel of communication with another cave whose entrance is but a short distance from that of the first.

ell's Cave are recorded, nothing but rude guesses which are all, I think, in excess of the truth. Carson supposed the Rotunda about on a level with the Mohawk and two or three hundred feet below the surface. Another explorer (Fletcher, 1853,) thought he had attained the river level, and that he had descended several hundred feet. Others have asserted the same. One visitor whose account was printed in 1824 wildly places the Rotunda at a depth of 500 feet. This would make it lie one hundred feet below the level of the river. As indicated on the new topographic maps of the National Geological Survey the height of the river at this point above mean sea level is 280 feet. The mouth of the cave is on the 680 foot level, so, to descend to the river's level the cavern must be 400 feet deep. My opinion based on observations made on one visit only, and from no actual measurements, is that it is little more than half that depth. Say 250 feet, and I think if actual measurement be made it will be found to not greatly exceed this estimate.

It is very doubtful if Mitchell's Cave was ever visited or resorted to by the Indians. Indeed it is not likely that its entrance was ever noticed by them unless some dusky hunter should have accidentally plunged down its narrow mouth.

The entrance being very narrow and on nearly level ground, still thinly wooded, might easily have been entirely concealed in former times while the primitive forest with its tangled mass of fallen trunks occupied the region. In passing through several heavy forests now existing on the Helderberg plateau in Albany Co., N. Y., one has to take great heed to his footsteps by reason of the numerous vertical joints which traverse the limestone of the region. These crevices, often a foot or more in width, and very deep, are frequently masked and hidden by a thin covering of fallen limbs and leaf-mold through which it is very easy to crush with the foot.

What a tumble would one take were he to come crashing into the Grand Rotunda of Mitchell's from some point in the woodland above. For it seems evident that its ceiling must be near the surface. This narrow but exceedingly high vault may have but a thin and treacherous roofing.

In concluding these random notes on Mitchell's Cave I will say that I know of but one other cave whose entrance is effected with so much difficulty. It is a small, dry, and romantic grotto in the Indian Ladder region of the Helderbergs, where to enter in the only true and respectful way one has to turn a complete summersault. The coming-out is worse than the going-in. To this I am sure Mr. Van Horne will readily bear witness.

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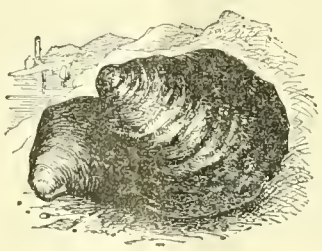

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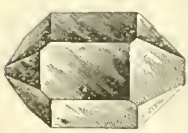

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., MARCH 15, 1898. No. 5

Migration of Birds at Seguin Light House.

BY HERBERT L. SPINNEY, 2ND ASSISTANT KEEPER.

The observations of which I shall speak have been made during the five years I have served as second assistant keeper of the light. This light is on Seguin Island at the entrance to the Kennebec River three miles from the mainland. The island is nearly a mile long by a third wide as the land runs, and is 145 feet above the sea at its highest elevation, upon which the lighthouse rises 35 feet more to the center of the lantern. The light is a fixed white light of the first order and is visible 19¾ miles.

During the spring while the birds are migrating north to their breeding localities, and again in the fall when returning south to winter quarters, many of the smaller birds, especially those of nocturnal flight, are attracted to the light in numbers varying from a few individuals to hundreds, according to conditions of the atmosphere. The nights which I have observed to be most favorable for this exhibition of bird phenomena are when during migration there have been severe fires at different localities, and the atmosphere has become impregnated with smoke, this combined with light southwest winds and clear nights offer the best results for observation.

On such nights as this, usually about nine o'clock, a few individuals may be seen flying around in the rays of light, while others at a short distance may be heard uttering chirping notes. Gradually the number increases until hundreds are in sight, looking like small meteors as they gyrate around the light, some drawing nearer, others receding almost out of sight in the darkness, only to return until many of them kill or injure themselves by striking the lantern, or some atmospheric change causes them to disappear, or daylight appears. Many will fly directly at the light and when almost near enough to strike the glass will suddenly rise, going over the lantern if they do not strike the top which many do injuring or killing themselves. Others would fly against the glass and struggle to get through until exhausted, when they would settle on the sash of the lantern, or on an iron rail and walk, which encircles it, only to commence the same struggle as soon as rested, this often lasting until daylight. On the walk mentioned there would be a hundred or more birds resting, and at the same time so many fluttering against the glass you could not count them. While many kill themselves by flying directly against the glass, the greatest mortality is caused by their suddenly rising out of the rays of the light and striking the top of the lantern which is copper. I have sat inside of the lantern on a night like the one mentioned and listened to them strike, sometimes faster than I could count, a number often striking at the same time, the vibration from the concussion causing it to appear as if a body of some pounds' weight had struck instead of a small warbler. This happens many nights during migration, from a few hours some nights, until near daylight on others. Other conditions favorable for this display are warm cloudy nights, very dark with little wind if any. Usually southwest winds seem to be most favorable although I have seen a fair display with the wind northeast, but this is the ex-

ception. During any these nights mentioned, should rain or strong winds come suddenly, all but a few individuals will leave at once or settle down on the ground. Should you then go out with a lantern you would find the grass full of them, and as you walk along they will fly up in all directions, some flying against your lantern, others alighting in front of you, only to repeat the same movements as you again approached near them

On some nights, when all conditions seemed favorable, and hundreds if not thousands of birds were scattered over the island, only scattering birds if any, would approach the light. I have noticed this many times when during the day I would walk over the island and notice the myriads of birds congregated, and think what a display the night would bring and the mortality which would accompany it, but when night came not a bird would make its appearance, nor could I next morning find a dead or disabled bird. If these birds went on their way as soon as night came, as many others must have taken their place during the night, for the next morning they would be as plenty as they were the past day. If they arrived during the night they did not manifest it by sight or sound in leaving or approaching the island.

I have never noticed any birds around the light during foggy weather excepting once, of which I will quote just as I have it in my journal.

"September 20, 1897. The wind today has been southeast and moderate. At 7 p. m. it commenced to rain, up to this no birds had been seen or heard around the light. 8:40 p. m. came fog, when suddenly the air resounded with the notes of birds and they could be seen flying around in the rays of the light. 9:25 p. m. the fog cleared and it rained very hard, when the birds all disappeared as quickly as as they came. Only two Pine Warblers came on the lantern."

I have noticed that some species are more persistent than others in remaining on the light, especially the Hermit Thrush, also the different sparrows and a few of the warblers. I have gone out side many times and taken them from the glass where they were struggling to get in, carried them down below the direct rays of the light and even into entire darkness, and released them, when they would invariably return to the light, some direct, others flying around in the rays of light gradually drawing nearer, until they would strike the glass and commence their struggles as before. I have repeated this experiment many times with the Hermit Thrush, Maryland Yellow-throat, Northern Parula Warbler and American Red-start, and of the Sparrows, White-throated, Song, Savannah and Bay-winged, but always with the same results. Not only have I noticed this persistency to return to the light, but also to the out buildings which are painted white. Where the light shone directly on them there would be a number of the same species struggling with the same persistency against the shingles, and on removing them I would have the same results as before mentioned. I have tried this experiment with the Red-eyed Vireo, Pine Warbler, Myrtle Warbler, Black-throated Green Warbler, and Leach's Petrel, and although some would return they would be the exception.

Of species which are attracted by the light, but seldom if ever strike it, may be mentioned the Black-breasted Plover, Ring-necked Plover, Sanderling Plover, Semipalmated Sandpiper, Least Sandpiper and Spotted Sandpiper. I have watched all of these species many nights, an hour or more at a time, circling around in the rays of the light each uttering the note peculiar to its species and apparantly much alarmed. Although they would linger around for so long a time, they only came within a certain distance of the light when they would recede nearly out of sight, only to return to the same distance as before. Although

they do not get bewildered and fly against the light, at Popham Beach on the main land the surfmen at the life-saving station often kill them with a walking stick or catch them with their hands while walking the beach with a lantern. As you approach them with the lantern they will run sideways with their eyes fiixed on the light until you are quite on them, when they will lie over on their sides in a helpless condition, completely at your mercy. My uncle, who belongs on that station, informed me recently of approaching within a few feet of a Snowy Owl which was resting on the beach near high tide mark. All he could seem to see at first was two large eyes. While moving away a short distance for something to kill it with it flew away. Many other incidents I might relate but think these quite enough at present in regard to these peculiarities.

That all birds do not migrate by the same route in spring as fall, or vice versa, is shown by the fact that during the nearly five years I have lived on the island, the Fox-colored Sparrow has not been seen during the fall —excepting this of '97, when on November 16 there was a large flight of Robins and Fox-colored Sparrows— but have invariably passed here in spring excepting this of '97. Of the Shore Lark it has been the reverse, and also the Snow Flake, only a scattering individual being seen in spring if any, but passing over in large flocks in fall. This fall of '97 they commenced to make their appearance the 18th of October, and from that date until Nov. 12th there was not a day favorable for flight that they did not pass over the island by hundreds, in flocks of from six to fifty individuals. I have also noticed this with the Snowy Owl. This bird seems to migrate in numbers every five years. The fall of '92 was noticeable as regards this, a large number being taken in this vicinity. Since that time I have only learned of a few individuals being seen. This fall ('97) they appeared again in numbers, three having been taken on the island and a number on the main land. These Owls have always made their appearance in this vicinity the middle of November and during the first of December, but have never appeared when returning north nor have I been able to learn of their being seen at other stations at that time of year.

A peculiarity I have noticed about the Red-winged and Rusty Blackbird is, where the Red-winged nests within four miles of the island I have seen it but once on the island, while the Rusty, which I think does not breed nearer than one hundred miles if as near as that, is a common spring and fall migrant. That these lights cause immense mortality to birds during migration can be shown by the fact that on Seguin Station alone from fifty to one hundred birds are killed many nights during migration (which is a low estimate) and then realize that the United States alone controls some ten or eleven hundred light houses and lighted beacons, and that many of them are directly in line of migration, then we must have some idea of what it means to bird life. Frank M. Chapman in his Handbook of Birds of Eastern North America states that after one storm 1400 birds were picked up at the base of the Batholdi Statue at the mouth of the Hudson river. Another way by which I think many birds must lose their lives is by being blown from land by strong winds, becoming exhausted and dropping into the sea. I have been out many mornings in a boat some half a mile or more from the island waiting for ducks to come to my decoys, when the day before and during the night the wind had blown very strong from the north or northwest, and about sunrise the small birds would begin to fly in from sea in numbers from one to three or four in sight at one time. This they would continue to do until noon. Many of them would be seen to drop

in the water so exhausted that even when within a few yards of the island they would have to succumb, others would just reach the shore at the edge of the water. I have had them light at my feet in this condition when gunning from the shore, so exhausted that their wings would rest on the rocks, and they would make no effort to get out of my way. Again I have seen them struggle to reach the island when with every few strokes of their wings the ends of the quills would touch the water, it not seeming possible for them to reach the land although most of them would. On a number of occasions when they have dropped within a short distance of the boat I have left my decoys and picked them up and after they had rested and got dried by the sun they would take wing and fly to the island. Although I have seen many of them drop in the water I have seen but one rise out of it. This was a sparrow which, rising three times in succession, finally reached the island. Of the large birds, such as Herons, Ducks, etc., I have only known of one instance of their striking this light. That was a Brant Goose which struck some part of the tower during the night and was picked up next morning with a disabled wing but still alive. I have heard of a number of other incidents along the coast where they have gone through the plate glass of the lantern. Such happened during this month at Half-way Rock Light, a Dusky Duck going through and striking the lens which surrounds the lamp and was taken up alive by the keeper.

Of the birds most abundant during migration and to which happens the greatest mortality are the White-throated, Song, Savannah, Vesper, Chipping and Swamp Sparrows, Maryland Yellow-throat, Myrtle, Pine, Parula, Black-throated Green, Am-Redstart, Water Thrush and Oven-bird Warblers and Hermit Thrush. Those of less numbers: Red-eyed Vireo, Least Flycatcher, Black and White, Magnolia, Blackpoll, Yellow Palm, Mourning, Wilson's and Canadian Warblers. Of rare occurence: Black throated Blue, Chestnut-sided, Bay-breasted and Blackburnian Warblers, Ruby and Golden-crowned Kinglets.

While I have noticed many Brown Creepers and Red-breasted Nuthatches on the lantern I have never found a dead or injured one.

Birds rarely found dead or seen on lantern: One Semipalmated Sandpiper, two least Sandpipers, one Spotted Sandpiper, one Yellow-leg, one Virginia Rail, one Barn Swallow, one Rose-breasted Grosbeak, one Black-bill Cuckoo, two Robins, three Rusty Blackbirds, one Golden-winged Woodpecker and three Yellow-bellied Sapsuckers.

Of other birds, of rare occurence on the island: Three Red-headed Woodpeckers, two Scarlet Tanagers, two Baltimore Orioles, three English Sparrows, one Ipswich Sparrow, one Mocking Bird, (this I took the 17th of September, 1897). I will mention also the unusual late occurrence of the Savannah Sparrow, of which I took a specimen Jan. 24, 1897. Of the year of '97 I will say that it has been unusual at the station from the fact that, excepting a few of the most common species, there has been a very small flight both spring and fall, with little mortality, so my observations for that date have been limited.

Bumble-bees and Fox-gloves.

BY ERNEST W. VICKERS.

The ways of bees in their relations with flowers, have long proved an interesting study for naturalists, as well as many beautiful figures and pretty fancies for poets. And not only bees but other insects which officiate as high priests in the marriage of flowers.

While visiting with a friend early in the past summer, I one day became amused by the actions of the bumble-bees as I stood admiring the great elegant spikes of blossoms on the Digital-

is which looked like beautiful wands which had blossomed by enchantment.

The mouths of the flowers are large enough to admit a bumble-bee readily, but become narrowed quickly, with a constriction at the base just outside the nectaries where the sweet fluid lay safely stored, just out of reach of the black tongue of the bee, who scrabbled and pushed, in his vain endeavor to get in just a little farther. Then he would tumble out, to try the same scramble up the throat of another flower with no better success.

And as I still stood watching, half admiring the elegant beauty of the flowers, half smiling at the awkward efforts of the bees, I beheld a new comer who was exercising new tactics. He too was a bumble-bee, hut made no attempt to enter the front-door which stood so temptingly wide open. He went—flew I mean—round to the back, and climbing up the flower till he reached a point just above the constriction, he raised the green leaves of the calyx which lay over the shoulders of the corolla like a cape, and almost before I knew what he was doing, had made an incision and thrust his mouth-parts through the back wall of the flower, and across to the spot where the sweet fluid lay.—Then away he went, and to perform the same neat trick at another flower.

Was this not curious and interesting? Here was one bumble-bee who never tried to go in at front door; there was the other who never tried anything else!

As quickly as bumbler number two came, the ear said, "Another species from number one;" and the eye said, "Number one is our Bombus—the common bumble-bee of our clover-fields in the Eastern United States. Number two is the Virginian Carpenter-bee common over the same country."

By kneeling on the ground and peering up into the flower I could see the mouth-parts of the latter bee, when they came through the wall of the corolla, and watch them fumbling and feeling about till they touched the right spot, which they did with considerable precision as if by the result of long experience.

In other days we boys distinguished these two species of bees by calling the Carpenter bumble-bee the "white-head" bumble-bee from his white face, as against the black head or face of our commoner bumble-bee. This distinction was of value and interest since white-head could not sting, having no stinger; whereas black-head certainly could as we sometimes learned to our sorrow, through eyes which speedily closed to the light of day for a season.

Now the question comes to us—Why does "white-head" know this trick, and "black-head" not know it? Is "white-head" more intelligent than "black-head?"—or was this an instinct implanted in one bee but not in the other? Or is it that "black-head" has not strong enough or large enough mouth-parts to perform the cute operation whereby to out-wit Dame Nature who evidently did not grow the fox-glove with a view to feeding bumble-bees?

One thing is true whatever the solution of the problem may be,—that the wood-cutting Carpenter-bee, as his habits of tunneling in timber require, has stronger, more highly developed mouth-parts than his relative who founds his colony in some old field-mouse nest or other prepared cavity in the ground.

But as I had no time to spend in spying more closely into this matter of bees and fox-gloves, I can but hint at its possible solution. This is a small riddle which bids you do a little observing for yourself. And glad I am to leave it so, if even one reader may be led to try and fathom the little mystery for himself, gleaning at the same time that peculinr pleasure which comes through the use of our powers in the work of original research.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

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Notes.

We owe an explanation to our readers. The February number was gotten out entirely during my absence in Chicago and the present number is fully a week behind owing to a trip East mainly to Boston. During February through the courtesy of the General Passenger Agent of the Grand Trunk R. R., we received passes to Chicago and return. Owing to our having formerly been located in Chicago in '93-4 we expected to feel quite at home there, but the various elevated roads that have sprung up in that city like mushrooms fairly confused us. Still after some inquiry we succeeded in locating all that is now left of the famous "White City" at Jackson Park, viz: The Art Building, now called The Field Columbian Museum. Six hours spent in this mammoth building scarcely did justice to the Mullusca alone. The shell collection is very incomplete, many common things still lacking, and doubtless through the oversight of clerks some labels misplaced and quite a number wrongly named. Still as a whole it is nicely arranged and a very interesting lot throughout.

One pleasant evening was spent with Dr. T. H. McCoy. He is a veteran shell man whose enthusiasm never flags. His specialty is Conus and Cypræa and one can here see a very fine selected lot of these families as well as Conchology in general. A couple of years ago the Doctor spent a year abroad only, however, finding two or three new Cypræa to add to his collection. His shells are mainly arranged in beautiful wall cases with narrow shelves so that one can see the entire collection without opening a draw or handling a specimen. The beautiful effects that can be made by showy shells arranged in this way must be seen to be appreciated.

Another entire forenoon was pleasantly spent examining the large shell collection of Mrs. Williams. While her time is almost entirely taken up with literary work she has still succeeded in building up since 1893 a superb collection of shells. They are arranged by families in beautiful glass cabinets in the library, parlor and even several rooms of the second story. In fact as Mrs. W. laughingly remarked, she had got to quit before long or they would force her out of her own home. Her collection of Cypræa is very large, we believe some 210 species and varieties, while the suites of Conus, Murex and other showy families we doubt can be excelled in this country, if in fact equalled. Our time was all too short to do justice to the collection, still we must mention the case of polished unios, which consists of some 130 species and probably 300 to 400 pairs. Every color of Pearl one can imagine is here shown in great profusion. We were also particularly struck with the beautiful coloring of the many species of "Mussel" shells, all finely polished and showing all

shades of purple, with occasional crimson and blue.

We fully expected to see the mammoth collection of Mr. Palmer but something arose each time we made an appointment so this enjoyable event had to be postponed until some future date.

Several hours were pleasantly spent at the Academy of Science Building in Lincoln Park where Prof. Baker and assistant Woodruff have things pretty much their own way. The collections of the Academy are now very large and well worth a visit. The Walton collection of Cypræa is on exhibition and the collections of fossils, birds, etc., has been greatly enlarged by recent acquisitions. Business engagements prevented further visiting.

March 10th we left for a brief trip East to examine some collections of shells and other specimens for sale there.

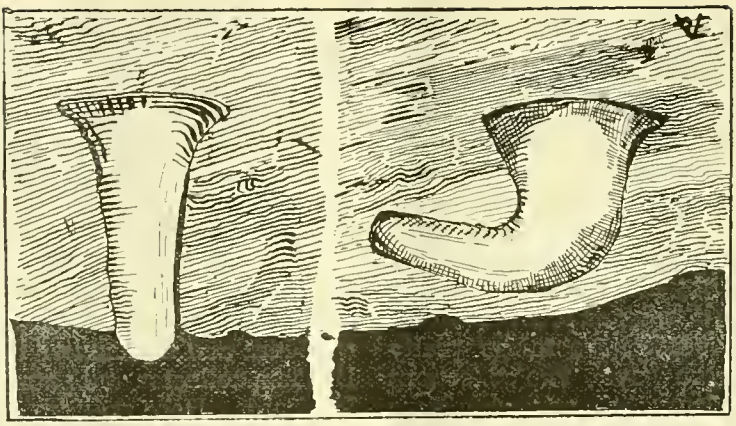
First stop was at Worcester where we found the genial taxidermist, C. K. Reed, hustling convex pieces together in a hurry for the Sportsman's Exposition. He reports heavy trade in the taxidermic line all winter, but still finds time to constantly get up new things in the line of tools for taxidermists and oologists, all of which we consider combine both fine quality and cheapness.

March 12th we visited Messrs. Eastman & Browne at Framingham. Mr. E's. fancy is almost entirely with the birds and his collection shows rare taste in selecting choice specimens. They are beautifully arranged by families in draws of proper depth. Mr. B. is a veteran collector in several lines and we only had time to hastily examine the Mollusca. The collection is mostly arranged in draws easily accessable. In fact his varions collections fill his library from top to bottom and are branching out to all parts of his residence. They show an endless amount of labor. He has them so fully catalogued any specimen can be instantly found and examined.

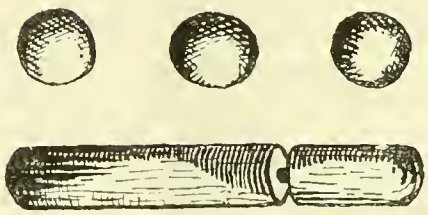
Our old friend Trowbridge we found had gone out into the country after the eggs of *Bubo virginianus*. In fact we were told that Brother T. has a few pairs of Owls that lay regularly for him each season and refuse to give up their treasures to other "Egg Fiends." After a brief look at his unique collection of all sizes and shapes of "hen fruit" we zigzaged across country a short distance to the residence and museum of the veteran Bahama collector and naturalist, C. J. Maynard. Here we were royally entertained and took no end of pleasure in examining the new species of Bahama birds Mr. M. is soon to describe and some *live Coons* new to science. Mr. Maynard is located, to our mind, in one of the most beautiful sections in Eastern Massachusetts. He carries on a large trade with schools but his work is chiefly known through "Contributions to Science," which appears in numbers as fast as Mr. M. is able to work up the vast quantity of new material he gathers in the Bahamas. We secured some very interesting material we have not heretofore handled and which will be offered MUSEUM readers later on.

From here a thirty minutes' ride through an endless chain of beautiful suburban villages brought us to historic old Cambridge, the seat of Harvard University. Several hours were spent in the Agassiz Museum, examining the Invertebrates mainly. The arrangement of the entire museum is peculiar. In order, for instance, to examine the Mollusca it is necessary to tramp over the entire Museum outside of the Mineralogy and Botanical floors. The invertebrate and vertebrate departments are divided into horizons as the South American fauna, Indian Ocean fauna, Australian fauna, etc. The collections as a whole are exceptionally fine.

From here we went to Lynn and Crescent Beaches on the ocean shore and spent a whole day watching the tide and collecting shrimps, shells,



Ordinary Stalactite and an unusual modified form (Blasanite) caused by growth under a powerful current, or blast of air.



Cave-pearls and broken cylinder from Mitchell's.

The above two cuts, mentioned in Mr. Van Epps article entitled "Mitchell's Cave, in February number, were by error omitted last month.

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etc. At this season of the year not much is to be found, still one can always find lots of interesting things along the beach of old ocean.

A half day was spent at the Sportsmen's Exposition now being held in Boston. Our space is too limited to give even a brief write up of this affair. There were many fine taxidermy exhibits and a specially fine lot of live birds, animals, fish, etc. Among the animals were Bear, Moose, Elk, Deer, Mt. Sheep, Mt. Goat, Lynx, Wild Cat, Badger, Mt. Lion, Coon, Prairie Dog, Flying Squirrel. In birds—Valley, Scaled, Massena and Common Qaail; Prairie Hen; Sharp-tail Grouse; various Pheasants; large number species of Ducks, Geese, etc., and many other birds and animals we cannot remember.

A brief visit was made to the store of N. L. Wilson. He carries a fine stock of minerals and one can get almost anything called for; also a fine general lot of curios and invertebrates for schools.

A few hours were very pleasantly spent in Whidden's Book Store. Our main purpose in visiting same was to examine Denton's new work on "Butterflies," and we must say it surpasses all our expectations. It is the only real thing in a Butterfly work. Arrangements were made to handle it and we shall be pleased to send circulars and descriptions. Price is $5.00 a part as issued. We secured some

other fine Natural History books which will be mentioned later.

One of the most enjoyable parts of our Eastern trip was with Dr. Huckens at Watertown. We recently secured his fine shell collection and we have now secured his other fine collections of Marine Specimens, Nests and Eggs and a large and fine lot of duplicate shells, which were not in the main collection. The condition of the specimens was something fine. One has to look long for a single imperfection. Lists of some secured will be seen on another page.

Many other collectors were seen for brief visits and some we fully expected to see, we were unable to make connections. We hope to see them next time. "Ye Editor."

Mr. Albert E. Colburn, lately of Edward S. Schmidt's Studio of Taxidermy, sailed for Patagonia, S. A., Nov. 7th last. He goes as general Zoologist for the expedition sent by Princeton University under the leadership of Prof. J. B. Hatcher. Zoology, Ethnology and Geology will be included in their collections. Prof. Hatcher and Mr. Colburn will stay at least a year and very probably two years in this little known region. The party will be landed in the Straits of Magellan and then travel inland several hundred miles by pack train. Mr. Colburn has had some previous experience in field work, having spent some time collecting in Florida and one summer in Newfoundland. He is also an expert workman in the taxidermic laboratory, having mastered the art under the eye of F. S. Webster, now Zoological Curator for the Carnegie Museum of Pittsburg.

Mr. Colburn is a Washingtonian and his many friends hope to see him return safely in due time from the land of giants; as it was formerly regarded.

P. S. Mr. Colburn arrived in the Straits of Magellan Dec. 10, all O. K.

Sea Pansies.

One of the most beautiful of the organisms on the Pacific Coast is the Renilla amethystina, or sea pansy, as it is very appropriately called. It is really a community of coral-like animals living in a structure somewhat of the size and shape of a pansy flower, with a short stem that further carries out the resemblance.

The color of the main structure is of a rich royal purple, while the jelly-like animals themselves are white, and peeping out from their doorway appear like stars in the firmament of the heavens.

These communities are not rare on our sandy shores, but may only be found by accident by those who have not learned the secrets of marine life. At low tide they may be found buried in the sands, with nothing to indicate their presence but an imperfect circular line in the smooth-washed surface of the beach that only a trained eye is likely at first to detect.

If one of these sea pansies is removed from the sand and placed in a dish of sea water, the creatures that form the community will soon manifest life, and reveal a most beautiful structure showing plainly their relationship to the coral 'insect.'

Each individual polyp in the community will be found to possess eight long fringed tentacles around a narrow disk. The numerous individuals of each community are arranged on the upper surface of a flattened cordate fleshy structure, to the lower surface of which is attached a stem like organ, useful alike as a means of locomotion and for the anchorage of the tenement house in the sand.

The sea pansy is a near ally of the sea pens and the sea fans which latter are branched and resemble beautiful flowering shrubs or plants. The organ-pipe coral belong to the same group of polyps according to some systems of classification. A hundred years ago the corals were all thought to be plants, as they closely imitated almost all kinds of vegetation, but they are now regarded as true animals.

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errones, L..... 10
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felina, Gmel..... 15
fimbricata, Gmel..... 10
flaveola, L..... 20
gangrenosa, Dill..... 10
helvola, L 10
hirundo, L..... 10
histrio, Gmel..... 25
icterina, Lam..... 05
iutermedia, L 20
irrorota, Sol 10
Isabella, L 10
Lamarckii, Gray..... 20
lurida, L 15
lynx, L..... 10
macula, A. Ad..... 25
mappa, L 75
Mauritiana, L 35
moneta, L 05
mus, L 15
neglecta, Sowb..... 10
nigro-punctata,Gray (not A1) 25
obvelata, Lam..... 10
ocellata, L 10
ouyx, L 30
pantherina, Sol..... 25
poraria, L..... 15
punctulata, Gray..... 20
reticulata, Mart..... 30
scurra Chem 25
Sowerbyi, Kieu 30
spadicea, Swam 50
spurca, L 15
stercoraria, L 20
tabescens, Sol 20
talpa, L 20
testudinaria, L 75
tigris, L 20
turdus, Lam 10
undata, L..... 10
ursellus, Gmel 15
variolaria, L..... 20
vitellus, L..... 10
ziczac, L. 10
Trivia.
Australis, Lam..... 15
Childreni, Gray..... 15
globosa, Gray..... 10
nivea, Migh..... 10
oryza, Lam..... 10
pediculus, L 10
pulex, Sol..... 10
quadripunctata, Gray 10
sanguinea, Gray..... 10
suffusa, Gray..... 10
Californica, Gray 25
limacina, Lam 20
Madagascarensis, Gmel 50
nucleus, L 10
pustulata, Lam 25
Solandri, Gray 15
stapbylæe, L..... 10
anuulata, Gray 15
cicercula, L 10
globula, L 15
Ovula.
ovum, L..... 30
verrucosus, L 15
gibbosa, L 10
emarginata, Sow 25
birostris, L. or volva..... 50
Cancellaria.
reticulata, L 10
Vermetus.
lumbricalis..... 25
Pterocera.
lambis L..... 30
elongata, Swan..... 1 00
aurantia, Lam 35
scorpio, Lam..... 75
millepeda, L 1 00
Fusus.
Colus, L 40
Ranella.
bufonia, Gmel. 25
spinosa, Lam 40
tuberculata, Brod 20
affinis, Brod..... 20
albivaricosa, Reeve..... 25
foliata, Brod 30
argus, Gmel. 25
Triton.
femorale, L 30
pilearis, L 25
rubecula, L 15
olearium, L 30
obscurus, Reeve..... 40
distortus, S and W..... 35
vespaceus, Lam 25
lanceolatus, Menke 15
tuberosus, L..... 25
Persona.
cancellinus, Roissy..... 30
Pleurotoma.
babylonia, Lam 35
grandis, Gray..... 40
australis, L 50
Latirus.
polygomus, Gmel 25
nodatus, Mart 25
varicosus, Reeve 20
Turbinella.
rustica, Lam 20
pyrum, L..... 40
Leucozonia.
cingulata, Lam 25
subrostrata, Gray..... 20
Peresternia.
pulchella, Reeve 20
gemmata, Reeve 15
Cymbium.
porcina, Lam 15
Neptunea.
decemcostata, Say..... 20
islandicus, Chem..... 20
Melongena.
pallida, Brod..... 20
putula, Brod 20
cochlidium, L 30
paradisiaca, Reeve 50
corona, Gmel 25
Fasciolaria.
trapezium, Linn 30
tulipa, Linn 20
distans, Lam..... 10
Sycotypus.
pyrum, Dill..... 15
papyraceus, Say 20
Cassis.
vibex, L 20
cornuta 1 50
testiculus, L 25
flammea, L 30
abbreviata, Lam 30
glauca, L 30
rufa, L 35
erinacea, L 25
tyrrhena, Lam 40
pyrum, Lam 35
canaliculata, Brug..... 15
semigranosa, Lam 20
Dolium.
fasciatum, Brug 20
perdix, L 40
maculatum, Lam..... 25
Malea.
Pomum, L 25
ringens, L 50
Oniscia.
cancellata, Sowb..... 40
Lamarckii, Desh 30
Harpa.
articularis, Lam..... 50
ventricosus, Lam 35
minor, Rumph 25
nobilis, Rumph..... 50
rosea, Lam..... 85
Conus.
virgo, L..... 25
litteratus, L 35
betulinus, L 50
vexillum, Mart 60
pulicarius, Hwass..... 20
panniculus, Lam 75
eburneus, Hwass..... 15
geographus, L 1 00
striatus, L 30
marmoreus, L..... 25
tessellatus, Hwass..... 20
generalis, L 35
Gabrielli, Kien 20
tiaratus, Brod..... 20
dux, Born 25
glans, Hwass..... 15
flammeus, Lam 75
consors, Sowb..... 25
lividus, Hwass 10
puncticulatus, Hws 15
miles, L 20
quercinus, Hws 40
Floridanus, Conr..... 15
daucus Hws..... 30
sponsalis, Chemn 15
flavidus, Lam 20
Arenatus, Hws 25
aureus, Hws 25
Hebræus, L 15
millaris, Hws..... 20
lithoglyptus, Meusch..... 25

testudinarius, Mart 35
capitaneus 20
sulcatus, Hws 35
" var. Bockl, Soy 30
tulipa, L 60
Strombus.
auris Dianæ, L 25
turritus, Lam 40
fasciatus, Born 20
luhuanus, L 15
dentatus, L 20
minimus, L 10
granulatus, Sby 15
vittatus, L 15
elegans, Sby 15
erosminus, Duc 25
gibberulus, L 15
lentiginosus, Linn 15
bubonius, Lam 1 00
lobatus, Swain 25
alatus, Lam 15
dilatatus, Swain 50
pugilis, L 15
cinarium, L 15
mauritianus, Lam 15
floridus, Lam 10
urceus, Lam 15
Murex.
adustus, Lam 25
fasciatus, Sby 20
pinnatus, Wood 75
radix 30
brandaris, L 25
scolopax, Lam 1 25
triqueter, Born 35
pomum, Gmel 25
palma-rosæ, Lam 4 00
salleanus, Adams 25
nubilus, Sby 25
bulbosa, Sol 30
turbinatus, Lam 30
Martinianus, Reeve 75
moticilla, Chemn 40
tenuispina, Lam 2 00
haustellum, L 75
truncutus, L 10
endivia, Lam 25
ramosus, L 30, 50, 2 00
Trophon.
Geversianus, Pallas 60
Spirula.
Peronii, Lam 15
lævis, Gray 20
Ianthina.
fragilis, Lam 15
Voluta.
pulchra, Sby 1 25
zebra, Leach 50
vexillum, Chem 1 50
vespertilio, L 25
musica, L 30
Turneri, Gray 50
Trochus.
gibberulus, Ad 20
flammulatus, Lam 25
niloticus, Gmel 50
" var maximus, Koch 50
Mauritianus, Gmel 30
pica, Linn 15
Turbo.
tessellatus, Kien 50
Norrisii, Sby 50
chrysostomus, L 25
argyrostomus, L 25
coronatus, Gmel 35
intercostalis, Menke 25
petholatus, Lam 35
marmoratus 50
" decorticated 75
sarmaticus decorticated 35
Astralium.
brevispina, Lam 30
longispina, Lam 30
Clanculus.
stigmatarius, A. Ad 15
puniceus, Phil 15
Calliostoma.
annulatum, Mart 20
Nassa.
papillosa, L 15
arcularia, L 10
obsoleta, L., 3 for 05
luteostoma, L., 2 for 05
tegula, Gould 05
crenulata, Reeve 10
nigella, Reeve 10
bicolor, Homb 05
suturalis, Lam 15
gandiosa, Hinds 10
monile, Kien 10
thersites, Brug 08
albescens, Dunk 10
reticulata, L 05
trivittata, Say 2 for 05
gibbosula, L 10
vibex, Say., 3 for 05
fossata, Gld 25
fasciata, Lam 10
paupera, Gmel 05
foveolata, Dunbe 10
incrassata, Strom 08
coccinella, L 05
geniculata, A ad 10
Siquijorensis, A ad 10
Buccinum.
undatum, Lam 15
Eggs of above 10
Urosalpinx.
cinereus, Say 05
floridana, Conr 60
Jopas.
sertum, Brug 30
Purpura.
armigera 30
lapillus 10
floridana, L 15
melones, Duc 15
Magellani, Val 20
cingulata Linn 15
saxicola, Val 10
deltoidea, Lam 10
luteostoma, Chemn 10
Rudolphii 10
pica, Blain 15
hippocastanenm, Lam 15
patula, L 10
neritoidea, L 20
Concholepas.
Peruviana Lam 20
Rapana.
bezoar L 15
Cuma.
tectum, Wood 25
Coronata, Lam 15
Klosquformis, Duc 20
Monoceras.
lugubre, Sow 20
lapillofdes, Conr 10
Crassilabrum, Lam 15
imbricatum, Lam 15
eugonatum, Cour 15
Ricinula.
ricinus, L 10
morus, Lam 10
horrida, Lam 15-25
tuberculata, Blain 10
anaxares, Duc 10
undata, Chemn 15
elongata Blain 10
concatenata, Lam 15
digitata, Lam 15
hystrix, L 15
Terebra.
maculata, L 25
lanceata, L 15
dislocata, Say 05
consors, Hinds 10
anomata, Gray 10
dimidiata, L 25
Ruma.
maura, Lam 20
bifasciata, Gray 20
melanostoma, Gm 10
Natica.
alapapillonis, Chemn
Marochiensis, Gm
vitellus, L
Neverita.
duplicata, Say 20
unifasciata, Lam 10
conica, Lam 10
glauca, Humb 25
Cerithium.
obeliscus, Brug
lineatum, Lam
litteratum, Brug
muscarium, Say 3 for 05
articulatum, Reeve 15
Adansonii, Rve 15
fasciatum, Brug 15
vertagus, L 15
pharos, Hinds 15
echinatum, Lam 15
aluco, L 10
asper, L 10
Trailliî, Sowb 10
minimus, Gmel 3 for 05
torulosum, L 10
corallinum, Duf 10
ocellatum, Brug 10
Cerithidea.
Montagnei, D Orb 15
decollata, L 10
sacrata, Gld 05
scalariformis, Say 05
Delphinula.
atrata, Reeve 20-10
Cantharus.
undosus, L 10
coromandellansus, L 10
Calliostoma.
costatum, Mart 10
miliaris, Broc 10
eximium, Reeve 10
canaliculatum, Mart 10
Monodonta.
Australis, Lam 20
mutabilis, Phil 15
Cantharides.
rutilus, Aad 05
Enchelus.
pullatus, Anton 10
Umbonium.
vestiarium, Linn 05
conicum, Ad 3 for 05
gigantea, Les 10
Mitra.
episcopalis, L. 5 inch 50
scabriuscula, L 20
adusta, Lam 15
pontificalis, Lam 20
ambigna, Swain 20
sphaerulata, Mart 30
cardinalis, Gmel 20
paupercula, L 10
filaris, L 10
litterata, Lam 15
(20 species unnamed.)
Turricula.
vulpecula, Linn 25
muriculata, Lam 10
corrugata, Lam 15
costellaris, Lam 20
Cylindra.
crenulata, Gmel 15
Imbricaria.
conica, Schum 20
Cantharus.
distortus Gray 25
elegans, Gray 20
cecilii, Phil 10
Tranquebaricus, Gmel 20
undosus, L 15
fumosus, Dill 10
gemmatus, Reeve 15
Chlorostoma.
brenneum, Phil 10
funebrale, Aad 10
Fissurella.
nodosa, Born 10
lata, Soy 25
funicularis, Kurr 10
Jukesi, Rve 10
crossa, Lam 15
hiantula, Lam 15
coarctata, King 15
Patella.
granatina, L 15-50
vulgata, L 10
plicata, Born 15
argentata Sowb 75
afra, Gmel 60
plumbea, Lam 15
coerulea, Lam 05
coeblear, Born 10
Acmæa.
testudinalis, Mull 05
scabra, Nutt 05
patina, Esch 10
mitra, Esch 10
persona, Esch 10
spectrum, Nutt 05
pelta, Esch 10
Potamides.
semiitrisulcatum, March 15
pacificus, Sby 20
fuscata, Linn 20
Humboldti, Val 15
Chiton.
spinosa, Brug 40
piceus, Gm 30

squamosus L. 10
Trochydermon.
ruber, Carp 15
Acanthopleura.
scabra, Rve 20
Bulla.
Ampulla, L 10-25
aspersa, Ad 10
striata, Lam 10
Atys.
naucum, L 15
cylindrica, Hab 10
Aplustrum.
Thalassiarchi, Mart 20
aplustre, L 20
Hydatina.
physis, L 25
Pythea.
scarabeus, L 15
Littorina.
varia, Sby 10
lutea, Phil 10
palleata, Say 05
undulata, Gray 05
filosa, Sby 05
zigzac, Chemn 05
zebra, Wood 05
fasciata, Gray 10
litorea, Linn 10
obtusa, L 05
irrorata, Say 10
angulifera, Lam 10
rudis, Don 05
Mauritiana, Lam 10
plauaxis, Nutt 05
pulchra, Phil 75
Nerita.
tessellata, Gmel 05
plexa, Chemn 20
histrio, L 10
spengleriana, Recl 10
Rumphii, Recl 10
bifasciata, L 20
quadricolor, Gmel 10
grossa, L 10
versicolor, Lam 05
albicella, L 08
chamæleon, L 10
scabricosta, L 10
patula, Recl 10
subsulcata Sby 08
ornata, Sby 10
Deshaysii, Recl 20
polita, L 08
peleronta, L 05
Neritina.
Tahitensis, Less 15
floridana, Shutt 05
Cummingiana, Recl 05
communis, Q & G 10
Owenii, L 15
dubia, Chemn 10
zigzac, Sby 05
pulligera, L 10
morio, L 05
granosa, Sby 15
virginia, L 05
reclivata, Say 05
Navicella.
Borbonica, Born 15
Nerita.
neritina, L 05
Marginella.
Adansonii, Kien 30
quinqueplicata, Lam 20
prunum, Gmel 30
ornata, Recl 15
cornea, Lam 10
cingulata, Dill 15
carneola, Stor 10
conoidalis, Kien 05
guttata, Dne 05
apicana, Mke 3 for 05
dactylus, Lam 20
persicula, L 15
roscida, Redf 05
ovulum, Sby 20
angustata, Sow 15
Columbella.
laevigata, L 3 for 05
fuscata, Sby 05
rustica, L 05
nitida Lam 2 for 05
discors, Gmel 15
pardalina, Lam 06
strombiformis, Lam 06
fulgurans, Lam 3 for 05

mercatoria, L 2 for 05
Scalaria.
communis, L 1
pretiosa, L $1.75 3 00
Gronlandica, Chemn 10
Solarium.
perspectivum, L 25-50
Sigaretus.
perspectivus, Say 1
Tectarius.
bullatus, Mart 5
muricatus, Lam 3 for 05
nodulosus, Gmel 05
pagodus, L 30
Pianaxis.
sulcatus, Born 05
Crucibulum.
umbrella, Desh 20
spinosum, Rve 1
trigonale, Rve 5
conc umeratum, Rve 10
Calyptræa.
Martiniana, Rve 1
Crepidula.
plana, Say 05
fornicata, Lam 05
Neritopsis.
radula, L 20
Achatinella.
bella, Rve 10
nemorata, Gild 15
rosea 10
ovata, Newc 10
venusta, Migh 15
lorata, Fer 10
rudis, Pfr 15
Mighelsiana Pfr 10
taeniolata, Pfr 10
textilis, Fer 10
variabilis, Newc 10
vividans, Migh 10
rugosa, Newc 10
plicata, Newc 10
abbreviata, Rve 10
perversus, Swain 10
umbilosa, Migh 10
virgulata, Migh 15
tessellata, Newc 15
elegans, Newc 10
rufa, Newc 15
swiftii, Newc 15
turritella, Swain 10
producta, Reeve 10
vulpina, Newc 10
tristis, Fer 10
decipiens, Newc 15
violacea, Newc 20
biplicata, Newc 10
citrina, Pfr 10
olivacea, Rve 10
affinis, Newc 10
mucronata Newc 15
crassa, Newc 10
diversa, Gnt 10
albolabris, Newc 10
Strophia.
mumia, Pfr 15
iostoma, Pfr 20
chrysolis, Pfr 15
nitela, Mayn 15
glans, Kust 05
incana, Born 05
nana, Mayn 10
intermedia, Mayn 10
pannosa, Mayn 10
maritiana, Pfr 10
Martensi, Weme 10
acuta, Mayn 10
alba, Mayn 10
Coryi, Mayn 10
bimarginata, Mayn 10
crassicostata, Mayn 10
perplexa, Mayn 10
pilsbryi, Mayn 10
neglecta agava, Mayn 10
carlotta, Mayn 10
cinerea Mayn 10
curtissii, Mayn 10
glans grisea, Mayn 10
parva, Mayn 10
thorndikei, Mayn 10
pilsbryi evolva, Mayn 10
eximea, Mayn 10
cinerea tracta, Mayn 10
lineota, Mayn 10
ritchiei, Mayn 15
cinerea mutata, Mayn 10

nitela, Mayn 10
Haliotis.
tuberculata, L 15
ovina, Ch 15
crocherodi, Leach 15
" polished 40
corrugata, gray 40
rugosa plicata, Ch 30
striata, L 20
Haliotis gigantea polished 40
" rufescens, " 1 25
" iris, " 1 25
Lignus.
fasciata, Mull 10 to 25
Orthalicus.
undatus, Brug 20
fasciatum 15
" var. solida 15
zoniferus, Streb 25
Achatina.
zebra, Lam 50
fulica, Fer 60
nummidica, Rve 20
suffusa 15
variegata, Fer 1 00
Bulimus.
perversus, Mull 15
Hargravesii, Cox 35
Algaensis, Rve 10
interruptus, Mull 15
detritus 15
auris-leporis, Brug 50
Dormani, W.G B 15
crassilabris, Garr 50
malleatus, Say 40
dealbatus, Say 10
Bahamensis, Pfr 10
elongatus, Bolt 20
citrina, Mull 20
iostoma, Sby 35
Spondylus.
pictorum, Ch 1 50
Dactylina.
dactylus, L 20
Pholas.
truncata, Say 10-20
costata, L 35
Petricola.
phaladiformis, Lam 15
Solen.
ensis 15
americanus, Bech 20
Michaera.
costata, Say 10
Mactra.
sunilis, Say 10
brasiliana, Say 10
veneritormis, Desh 10
Mya.
arenaria, L 10
Tellina.
virgata, L 10
radiata, L 10
diaphana, Desh 10
magna 50
alternata, Say 10
laevigatum 10
olivacea, Jay 10
Gouldii 10
Asaphis.
cochinea, Mart 15
rugosa, Lam 15
Macoma.
inquinata, Desh 10
fusca, Say 10
constricta, Brug 10
Donax.
variabilis, Say 2 for 05
roemeri, Phil 05
bimaculatum, Dill 05
californicus, Com 05
denticulatus, L 10
punctatastristus, Han 10
rugosus, L 15
Callista.
gigantea, Gmel 15
dione, L 25
Cryptogramma.
flexuosa L 15
scabra, Han 15
squamosa, L 15
subrugosa, Ant 15
Tapes.
litterata, L 20
decussata, L 15
virginea, L 10
grafia 75

Chione.
Sinuilima..... 15
Guidia, Sowb..... 30
Circe.
scripta, L..... 15
Dosinia.
concentrica, Born..... 15
discus, Reeve..... 15
Cyprina.
islandica, Lam..... 10
Corbus.
fimbricata, Cur..... 25
Lucina.
strigilla, Stimp..... 10
dentata, Wood..... 10
children, Gray..... 20
tigerina, L..... 15
Pennsylvanica, L..... 10
Jamaicensis, Lam..... 10
Cnama.
arcinella..... 10
Solemya.
borealis, Tott..... 05
Mytilis.
hamatus, Say..... 10
Dunkeri, Rve..... 25
Modiola.
plicatula, Lam..... 10
tulipa, Lam..... 15
Cardita.
bicolor, Lam..... 10
Avicula.
ala-perdicis, Rve..... 15
Arca.
transversa, Say..... 10
Noæ, L..... 10
pexata, Say..... 10
incongrua, Say..... 15
floridana, Try..... 10
Trigonia.
pectinata, L..... 25
Pecten.
æquisulcatus, Carp..... 20
nodosus, L..... 10
tenuicostatum, Migh..... 75
caurina, Gould..... 1 00
zigzag, L..... 40
dislocatus, Try..... 15
plica, L..... 25
varius, L..... 20
irradians, Lam..... 15
Perna.
ephippium, L..... 15
Anomia.
ephippium, L..... 15
Terebratula.
vitrea, Gm..... 40
septentrionalis..... 15
Cardium.
maculatum, Gmel..... 20
Groenlandicum, Ch..... 30
unedo, L..... 20
muricatum, L..... 15
Islandicum, L..... 10
costatum, L..... 1 00
Laevicardium.
oblongum, Ch..... 25
serratum, L..... 15
Lunulicardia.
auricula, Fars..... 20
Planorbis.
ammon, Gld..... 05
cornea, L..... 10
bicarinatus, Say..... 03
companulatus, Say..... 05
lentus, Say..... 10
Cyclostoma.
sulcatum..... 10
pictum, Pfr..... 15
elegans, 3 for..... 05
Trochatella.
pulchella, Gray..... 05
Phasianella.
Australis, Gmel..... 20
variegata, Lam..... 10
Gibbulina.
palanga, Fer..... 10
Clausilia.
grisea, Desh..... 02
bidens, L..... 02
Limnæa.
catascopium, Say..... 05
palustris, Mull..... 10
exilis, Lea..... 05
elodes, Say., 4 for..... 05
megasoma, Say..... 10
stagnalis, L..... 05

Trypanostoma.
subulare, Lea..... 05
elongata, Lea..... 05
Thorntoni, Lea..... 05
Atopoma.
hæmastoma, Ant..... 10
Pirene.
Atra, L..... 20
Melantho.
Integer, DeKay..... 05
" reversed..... 50
Unio.
Asperrimus, Lea..... 15
alasmodontinus, Raf..... 15
ater, Lea..... 15
asperatus, Lea..... 15
alatus, Say..... 20
aquilis, Lea..... 15
Buckleyi, Lea..... 15
complanatus, Sol..... 05
cuneatus, Raf..... 10
cylindricus, Say..... 10
Conradicus, Lea..... 15
cumberlandianus, Lea..... 10
coelatus, Cour..... 10
carinatus, Say..... 20
Chattanoogaensis, Lea..... 20
costatus, Raf..... 15
cyphius, Raf..... 05
Cooperianus, Lea..... 10
capax, Green..... 20
cascaenes, Lea..... 20
concestator, Lea..... 10
Downieanus, Lea..... 15
dilatatus, Raf..... 10
dromas, Lea..... 10
exiguus, Lea..... 15
flavus, Raf..... 15
flagosus, Can..... 15
flexuosus, Raf..... 10
fallax, Lea..... 10
fasciolus, Raf..... 15
Forsheyi, Lea..... 15
flavidens, Ben..... 20
fasciolaris, Raf..... 15
Forenianianus, Lea..... 15
Fisherianus, Lea..... 15
Gilbertl..... 15
glans, Lea..... 10
gibber, Lea..... 15
intercedens, Lea..... 10
iris, Lea..... 10
intermedius, Cour..... 15
Kleinianus, Lea..... 15
ligamentinus, Lam..... 25
lugubris, Lea..... 10
lapillus, Say..... 10
lanceolatus, Lea..... 10
lineolatus, Raf..... 20
lineatus, Lea..... 10
Meukeanus, Lea..... 10
Mississippiensis, Con..... 10
metastriatus, Con..... 10
metanever, Raf..... 10
nodulatus, Lea..... 10
nasutus, Say..... 10
novi-eboraci, Lea..... 10
nervosus, Raf..... 10
niger, Raf..... 10
obovalis, Raf..... 10
opalinus, Auth..... 10
ochraceus, Say..... 10
obscurus, Lea..... 10
Pybasi, Lea..... 10
parvus, Barnes..... 10
perplicatus, Con..... 15
pyramidatus, Lea..... 10
prasinus, Cour..... 10
pustulosus, Lea..... 10
pearlensis, Lea..... 20
quadrulus, Raf..... 15
ridibundus, Say..... 10
radiatus, Gmel..... 10
reflexus, Raf..... 10
ruber, Raf..... 10
rubiginosus, Lam..... 10
Raugianus, Lea..... 10
retusus, Lam..... 10
rectus, Lam..... 20
subrotundus, Raf..... 10
Shepardianus, Lea..... 10
siliquoides, Barnes..... 15
spinosus, Lea..... 1 00
Sowerbyi, Lea..... 10
subtentus, Say..... 10
spatulatus, Lea..... 10
stegarius, Raf..... 15

scamnatus, Mar..... 15
securiformis..... 10
truncatus, Raf..... 15
teres, Raf..... 15
triquetor, Raf..... 15
traballs, Conr..... 15
tuberculatus, Raf..... 10
verrucosus, Raf..... 10
zieglerianus, Lea..... 15
Anadonta.
complanata, Barnes..... 25
decora, Lea..... 15
edentula, Lea..... 15
fluviatilis, Dill..... 25
lata, Raf..... 10
Nuttalliana, Lea..... 15
Margaritana.
confragosa, Say..... 10
deltoidea, Lea..... 15
Holstonia, Lea..... 10
marginata, Say..... 15
rugosa, Barnes..... 10
undulata, Say..... 10

This lot of Unios are all exceptionally fine specimens being perfect and finely cleaned. They make a very handsome showing in the draws.

Helix, American
arrosa, Gld..... 10
Arnheimi, Doll..... 20
auriculata, Say..... 05
albolabris, Say..... 03
Ayresiana, Newc..... 15
alternata, Say..... 03
appressa, Say..... 03
avara, Say..... 05
Andrewsi, W. G. B..... 10
altispira, Pils..... 05
arborea, Say..... 01
Berlandierana, Mar..... 05
bucculenta, Top..... 05
concavus, Say..... 04
Cantiana, Mart..... 05
Columbianus, Lea..... 04
Californensis, Lea..... 05
capnodes, W. G. B..... 06
cellarus, Mull..... 03
clausa, Say..... 03
carpenteriana, Bld..... 05
carolinensis, Lea..... 05
Colisella, Pils..... 05
cereolus, Mubl..... 05
cumberlandiana, Lea..... 05
Dupetithouarsi, Desh..... 10
dentifera, Binn..... 05
divestus, Gld..... 10
dorfeuilliana, Lea..... 05
elevata, Say..... 01
exoleta, Binn..... 05
fidelis, Gray..... 05
" albino..... 25
fuliginosus, Gray..... 05
fraterna, Say..... 05
fallax, Say..... 03
gularis, Say..... 05
hirsuta, Say..... 05
Hopetonensis, Sb..... 10
Hazardi, Bld..... 15
inflecta, Say..... 03
luterna, Say..... 03
intertextus, Say..... 05
inornatus, Say..... 05
infumata, Gr..... 35
Kelletti, Fbs..... 20
Leai, Pfr..... 05
laprosa, Bld..... 05
ligerus, Say..... 01
laevigatus, Pfr..... 10
Major, Bld..... 10
multilineata, Say..... 05
mitchelliana, Lea..... 05
monodon, Rack..... 05
micklniana, Lea..... 10
Newberryanum, W. G. B..... 25
orbiculata, Say..... 02
olneyi, Pils..... 10
palliata, Say..... 05
ptychophora, A. D. B..... 10
perspectiva, Say..... 02
perigrapta, Pils..... 10
Pensylvanica, Green..... 05
profunda, Say..... 05
Roemeri, Pfr..... 15
ramentosa, Gld..... 10
rugeli, Shutt..... 05
strigosa, Gld..... 15

stearnsiana, Gabb..... 15
striatella, Anth..... 02
Sargentiana, J. and P..... 10
solitaria, Say 05
sayi, Binn..... 05
subplanus, Binn..... 05
septemvolva, Say..... 05
stenotrema, Fer..... 10
spinosa, Lea..... 10
tridentata, Say..... 02
Townseudiana, Lea..... 05
throides, Say..... 05
vancouverensis, Lea..... 05
virdufus, Menke..... 05

Helix, Foreign.

ammonis, Schm..... 05
aphrodyte, Pfr..... 75
algirus, L..... 15
arbustorum, L 05
anricoma, Fer..... 10
Austriaca, Chit..... 15
aperta, Born..... 08
alauda, Fer..... 15
alfredi, Cox..... 20
Bermudensis, Pfr..... 15
Balaerica, Zieg..... 15
carthusiana, Mull 04
cantiana, Mtg..... 08
carinifera, Samp..... 20
cespitum, Drap..... 10
cretica, Fer..... 05
cincta, Mull 19
cingulata, Stud..... 10
connectens, Mlldf..... 75
carniolicus, A. Sch..... 15
candicans, Zieg..... 03
candidula, Stud 02
canaliculata, Pfr..... 40
cunningbami, Gray..... 30
cicatricasa, Mull..... 20
citrina, L 20
derbentina, Andr..... 05
ericetorum, Mull..... 03
fodiens, Pfr..... 15
Fraseri, Gray..... 50
fruticum, Mull..... 04
figulina, Par..... 10
glasiana, Shutt..... 25
griseola, Mull..... 25
humphreysiana, Lea 30
hortensis, Mull..... 05
hispida, L..... 03
haemastomns, L..... 15
incei, Pfr..... 15
intorta, Sby 20
incarnata, Mull..... 10
inequalis, Pfr..... 10
lapicida, L..... 05
lactea, Mull..... 10
latefasciata, v Moell..... 25
llvesayi, Pfr..... 25
lens, Fer..... 05
lusorum, Mull..... 15
Macgregori, Cox..... 20
millerii, Pfr..... 15
marginata, Mull..... 15
marmorata, Fer..... 10
magnifica, Fer..... 1 00
muscarium, Lea..... 10
melanistoma, Drap..... 10
modesta, Pfr. 30
melanotragus, Born..... 15
neglecta, Pils..... 10
nemoralis, Mull..... 05
obvoluta, Mull..... 10
obvia, mke..... 03
personata, Lam..... 05
pisania, Mull..... 03
peliomphala, Pfr..... 20
puella, Brod..... 25
praetexta, Mart..... 25
provisoria, Pfr..... 15
profuga, Schm..... 03
phœnix, Pfr..... 30
pomatia, L 05
rufezonata, Ad..... 10
raregutta, Mss..... 25
rubens, Mlldf..... 10
speciosa, Jay..... 15
sarcostoma, Webb..... 25
Studeriana, Fer..... 35
sicana, Zieg..... 06
salvatoria, Pfr..... 10
secernenda, Rm..... 20
Troscheli, Pfr..... 10
trochus, Mull 20
videns, Mart 15
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varians, Menke 05
zonulata, Fer..... 20

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Fluor Spar	10
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Geode	10
Graphite	10
Magnesite	10
Onyx	10
Gypsum fine	10
Pyrites	10
Drusy Quartz	10
Glassy "	10
Rose "	10
Milky "	10
Hematite	10
Satin Spar	10
Selenite	10
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Tufa	10
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VOL. IV. NO. 6.

APRIL, 1898.

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A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., APRIL 15, 1898. No. 6

Notes from Florida.

Of all delightful experiences in the way of winter pastimes the most pleasurable to me is that of cruising about on the rivers of the South. It has been my good fortune to float down several streams at the North, and it has appeared that this method of collecting is equal to any other, but a northern trip among birds with which one is familiar, fades into insignificance when compared to a river trip in Florida. Here one is continually meeting with strange sights, while the special feature of intetest to a collector of birds and eggs are constantly presenting themselves.

The Indian river, on which I spent several weeks at different times and trips, is visited by the Ducks of the North which winter here. At times one might say that the so-called river is covered by one mighty flock of Ducks, for so closely together do these flocks come, that at a little distance it appears as if there was one continuous flock as far as the eye can see. The principal kind of Ducks in the flocks is the Lesser Scaup, in fact there are hundreds of this species to any other kind of Duck in the state, or at least it is so on the salt water lagoons. In these large flocks of Lesser Scaup, or Little Blackheads or Blue-bill as they are more generally called, there are some Big Blue-bills or American Scaups. These flocks of Blue-bills are so dense and extensive that I have seen a steamer on the river constantly scaring up detachments of flocks for miles. For miles and miles in January and February the river is covered with them and many may be seen within gun-range at once. Of the other Ducks here are Mallards, Teal, Pintail, Widgeon, Shoveler and Black Ducks and the Buff-breasted Goosander.

The common "Hell-driver" and familiar Loon of the North are also seen both in fresh and salt water. Kingfishers and spotted Sandpipers dash out from log shore or snag as at the North. Kildeer Plover remind us of home while Hermit and brown Thrush, Catbirds and Robins, the last in thousands, are all here.

Among the Herons are the Great Blue, Little Blue, White, Snowy and Louisiana. The change of color in the plumage of some of these birds makes it difficult to identify immatures at times. The Louisiana, Great and Little Blue Herona breed abundantly, and were nesting in vast heronies in isolated regions about the middle of March.

As an indication of the advancement of the season I would record that several young Bald Eagles, nearly full grown were taken from the nests in February, while I saw two nearly full grown young Pelicans swimming about on March first. On March third two Sandhill Crane's eggs were taken which were about to hatch. The nest was placed on the ground and was composed of coarse weeds and very loosely put together.

There are great numbers of Gulls and Terns here, but as I am from an interior section of the North these birds cannot all be identified by me. The American Herring, Ring-billed and Bonapartes' Gull and the Royal, Least, Black and Common Terns were seen.

Cormorants and Pelicans are to be seen everywhere in the neighborhood of salt water, while the Darter or Water Turkey (Anhinga) is found both in the lagoons as well as on the fresh water. One collector could take a thousand Brown Pelican's eggs in a very short

time. The main trouble in collecting them is in the blowing, which is not a small undertaking, and the trouble of transporting so bulky a load.

Plume birds are scarce and getting scarcer. There are still plenty of White and Snowy Herons but they are very shy. I have seen flocks of these persecuted birds rise when we came in sight of them. In a three month' trip I have failed to see a single Roseate Spoonbill. They are becoming rare excepting in the wilder parts of the interior.

At Jupiter I met Billy Bowlings a direct descendant, son or grandson of the historically celebrated Seminole of the same name. Billy was selling Heron's plumes to the dear ladies, who are ever ready buyers. Around his head were wrapped one or two small shawls, a lot of ingrain carpet and a variety of other material. The whole turban being quite seven inches high and fully twelve inches in diameter, and was held together by a big shining band. The headgear must have weighed fully six or seven pounds, and it was surmounted by a White Heron's plume. His ears had large rings in them and for neck-wear he had six differently colored gaudy handkerchiefs surmounted by a cheap four-in-hand tie. Three shirts, the outer one being shortest, in order to show the colers below, and none of them too long, constituted his sole body wear.

Billy was right in style with the ladies, as he had the sleeves of the outer gingham shirt puffed, puckered and tucked up to beat all. But though so elaborately dressed above, I must record that Billy Bowlings was clothed with very scanty dressed leather leggings which but partially concealed his bow (?) legs.

Of the Rail family I have met with the Sora and American Coot only. The Purple Gallinule is not common that I can learn, but I expect to meet with it in the interior. The habits of the Turnstone interested me and the peculiar ways of this pleasing bird were subject for much observation. The Florida Bob-white is slightly smaller and of a darker color than its northern relative. In fact this rule generally obtains, that southern varieties of birds and mammals are smaller than those of further north. Do not understand me as giving this as a fixed rule, for I am well aware that a Fox Squirrel here is a half larger than the northern representative. However the Gray Squirrel and Deer are much less in size here than at the north.

Wild Turkeys are brought into the little settlements by the white and Seminole hunters every day, as is also a plenty of venison and many other kinds of game and a large variety of fish. At one place at which I stopped we caught fourteen kinds of fishes and all of them were good for food. The fishing resources of Florida are unlimited, and the pleasure which an angling tourist may secure from a winter in the state is great.

One of the most interesting birds in the south, is that unassuming, unsuspicious, lovable little creature, the Ground Dove. The first time I ever saw it I was pleased with its ways and after an acquaintance of several years I am still more favorably impressed by its demure manners. It nests here abundantly laying two small white eggs of the regulation Pigeon shape. The Mourning Dove is also here but is rare compared to the Ground Dove in quarters that I have visited.

There are Turkey Buzzards everywhere, and it is rare to look about the heavens without seeing from one to a score of birds. Black Vultures are seen only in certain quarters and are unknown in some sections. When these birds take possession of a locality, the Turkey Buzzards are driven away and kept away. If any of our subscribers can furnish authentic notes on this subject I should be glad to hear.

The Marsh Harrier is here and is to be seen sailing low over the Savannas. The Red-tailed and Red-shouldered Hawks are found, the latter, a Florida

variety, nesting plentifully. One nest was in a Palmetto and only twenty-two feet from the ground. The Hawk is as noisy here as at the north and its nest can be easily found. I saw a pair of Swallow-tailed Kites sweeping about in the air. The evolutions are remarkably graceful and yet combining dash and rapidity in their movements. There are any quantity of Bald Eagles in this state and they are pleasing and powerful flyers. It is difficult to realize how swiftly an Eagle is flying unless one is close by when a dash is made. Sparrow Hawks are not rare and I met with one Duck Hawk. Two Owls, the Florida Barred and Barn Owl are the only ones I have met with as yet. The latter is called the "Monkey-faced" Owl here.

Of the Woodpeckers I have only met with three on the trip, namely the Red-bellied, Flicker and Pileated, all of which inhabit the Palmetto shrub thickets, however the latter is not as wild as it generally is at the North and I have repeatedly worked quite close without alarming it.

The Chuck-will's widow is common here and tunes up generally on its arrival from further South about the middle of March. It is called the Whip-poor-will by all settlers who have moved here from the North. The notes certainly do have the same kind of a piercing chuckle to them, yet to an educated ear the difference is marked.

Our common Pewee is here, also the Crow and Blue Jay, though the two latter are now acknowledged to be varieties. There is also the Florida Jay, which is commonly known here as the "Scrub Jay" from its preference for thickets.

There are many Grackles here; and reasoning that a bird should become a variety when its notes are different from another species or race, then the Florida Grackle certainly is entitled to distinction. For the queer notes of this Blackbird are entirely different from the Bronzed Grackle's efforts.

This letter is already too long and with remarks on a few well-known species I will close.

The Carolina Wren is a pleasing bird. It sings plaintively and in a variety of strains, and its notes can be compared with those of the Robin. The Yellow-rumped Warblers and Cardinals are ubiquitious here in winter, and with the Mockingbirds are the life of the glades. There are White-bellied Swallows in myraids. Among the Warblers are the Chestnut-sided, Yellow-throated, Prairie and Oven-bird.

Perhaps this letter will fail to please many of your readers as it does not record the taking of many specimens but it must be remembered that the season has really not opened fairly. Very few species besides the Herons, Pelicans and other water birds, and Hawks have begun to nest at the time this is written.

There is a pleasure in sailing about, even if one cannot take many rare eggs. I shall always remember my trips on the Indian, Sebastian and Loxaeatchie rivers, and the connecting lagoons as the most agreeable days spent in Florida among the birds.

I would like to describe our boat and how we sail, fish, eat and sleep, and a hundred features of a cruise, but this will be postponed.

A SUBSCIBER.

Reminiscences.

The afternoon being a showery one, precluding all possibility of my spending it pleasantly out-of-doors in quest natural history specimens, I have shut myself up in my den and for an hour past have been engaged in the re-perusal of some back volumes of journals of nature.

In Vol. III, No. 5 of this magazine I am confronted on pages 76-7 by an article emanating from this pencil under the caption, "Condition of Archæology in Mexico." I have re-read this rather vituperative ebullition of pent up wrath and I am convinced that the consummine anger engender-

ed by the vexations and innumerable difficulties which opposed me on every hand in my archæological research influenced me to be too harsh and scathing in my criticisms of the course pursued by the Mexican government relative to Aztec antiquities. I very cheerfully and gracefully concede that there exists a bare shadow of a possibility that those edicts may have been prompted by incentives other than purely selfish motives though I am by no means satisfied that that shadow is anything more than a shadow.

As perhaps few of our readers have enjoyed the privilege of collecting the personal remains, household and agricultural chattels and instruments of war of whilom noble children of the Montezumas, and endured the entailed hardships of said privilege, I will this watery afternoon, recount a few of my personal experiences, in lieu of basking my devoted shines in laboriously ascending a moss-festooned and rough-sided live oak, seeking to disposses a wild-eyed Bubo of her globular treasures.

As the majority of the modern decendants of the Aztecs speak the Spanish language, a speaking knowledge of that tongue is one of the most valuable and important ascessories to your success. To be sure, in conversing among themselves, the Indians drop La Costillana employing only their own dialect but I could never bring myself to the point of attempting to gain an extensive vocobulary in their queer jargon. Two additional requisites are a big six-shooter and barrels of nerve, that is, if you intend penetrating far into the interior and exhume personally or superintend the excavations and be positive that you are really procuring relics of a vanquished people.

In Mexico City and environments are relic factories by scores and a tyro's eye can scarce distinguish the bona fide article from the spurious counterfieit. In fact, I have placed them side by side—relics that I knew to be genuine and clever imitations that I knew to be imitations and their appearances were dangerously similar. They have attained a perfection in the art of imitation that is truly marvelous, producing articles which in form, contour, feature and material are almost exact fac similes of the much-sought Aztec relic. They even bury their imitations for a short period that the earth may fill the purposely left chinks and cracks, and cling to the object and impart to it an ancient appearance. I would advise no novice to purchase "relics" of mendicants nor itinerant peddlars in Mexico for the chances are ten to one that he will bargain for a worthless copy. I do not think that it would be an exaggeration to assert that the large majority of so-called relics purchased by tourists are the products of relic factories and over whose heads have not passed half a dozen birthdays.

I know of no better expedient for securing authentic material than the plan adapted by me in Southern Mexica during my travels in that country in the winter and spring of 1897. I studiously avoided professional venders of Aztec ware but repaired to the ancient Indian villiages, where maneder directly beneath the feet of their posterity, the mortal remains of the aborigines as Hernando Cortez discovered and subjugated them in the sixteenth century. Numbers of these quaint but squalid and long populated towns are still inhabited solely by full-blooded Indians.

It may surprise some as greatly as it did me when flrst I was made aware of the fact, that three-fourths of the present entire population of the Mexican Republic are Indians, through whose viens there courses not a drop of alien blood. My explorations were mainly in the beautiful and fertile Toluca Valley in Indian pueblos contiguous to the sprightly and in some respects, the progressive city of Toluca, the capital and metropolis of the State of Mexico. In this valley lie

virgin fields in which repose the bones of generations and generations, images of idolatry and implements of civilization and of war, thus far untouched by the despoiling hand of the archæologist. There are certain sections of this valley, the property of fanatic pagans who guard these resting places of their departed with such consummate and indefatigable zeal that not one of the ten thousand objects reposing but a few inches below the surface of the earth has ever been brought to light. But there are others whose cupidity gets the upper hand of their superstition to such a degree that they gladly barter the bones of their ancestors for a paltry stipend. It was from the later class that I reaped my richest harvests.

To describe, in extenso, an Indian town might possibly be thought a serious digression though even a superficial knowledge of the outline of such a town would enable the reader to better comprehend these remarks. Upon entering the place we accost the first inhabitant upon whom our eye alights and make inquiries concerning the antiquities so abundant in the vicinity. Their invariable reply is, "No hay nada, senor; no tenemos nada," which is being interpreted, "There is nothing, sir; we have nothing, and which is, furthermore, in the majority of cases, a most prodigous prevarication, for there exists no greater a dissembler than a Mexican Indian. It is then necessary for us to persist and incidentally to display a few pieces of the coin of the realm. This in most cases is followed at once by the desired result and you are in the confidence of the noble red man and may purchase anything he possesses from his best burro down to his squaw. There is an old adage, of Spanish origin, I think, the gist of which is embodied in this sentence: "Few are the locks which may not be opened by a golden key." In the present instance I may substitute the baser metal "copper" for "gold." Most of these pagans will enlist in your service for a consideration of a few reals per diem and under your direction tear from their humble sepulchres their fore-fathers' decaying forms, with attending pottery, knives, images, et cetera. These things are exhumed at depths varying from 12 to 36 inches below the surface and in the very door-yard of your workman. The surprise of these people at fining these articles is most amusing. Vessels of innumerable shape, design and dimensions are found and for what purposes they served, it is not for me, an humble neophyte in this science, to vouch safe.

Some types are similar in pattern to those in use today while others have no modern representatives. Burial urns are rare objects and I encountered but one, for which a stiff remuneration was required. In ancient Thacotepec some half dozen miles distant from Toluca, I one day had the good fortune to have disinterred an earthern flute of several notes upon which music could yet be made.

Among many other objects, these excavations reveal keen-edged blades of that beautiful glass of volcanic origin, obsidian a few "arrowheads" of the same material though these are not found in exuberance, small images of sun baked earth representing men, boys, birds, etc. in marveleously perfect preservation. Occasionally an image wrought in stone is found though these finds are not common. Small clay wheels, their surfaces carved in fanciful designs and decorated in gaudy colors still brilliant, which were presumably used in weaving and pottery in such quantity as to near craze an enthusiastic counsisseur with ineffible delight.

Doubtless now recurs to your mind mind those stringent laws touching the exportation of all these acquisitions. Reader, I shall not commit myself by asseverating whether or not any relic accompanied me when I recrossed El Rio Grande to my native Texas but I will only say, *entre nous*, that I am

strongly impressed that such a thing *might* be and allow you to deduce a conclusion.

But for the present I shall desist lest my verbosity wearies you. At another time, if desired, I have many reminiscences to impose upon you—what I saw in the Mexican National Museum and many other things.

JAMES J. CARROLL,
Refugio, Texas.

Reminiscences of a Naturalist.

In the summer of 1864 I met that veteran conchologist, Dr. Wesley Newcomb, for the first time, having called upon him in response to an invitation sent to me through the late Dr. William M. Gobb, the latter at that time holding the position of Paleontologist to the Geological Survey of California, of which Prof. J. D. Whitney was the director. I remember very clearly the afternoon when I first met the worthy doctor, and the acquaintanceship then commenced developed into a friendship that continued for many years.

At the time referred to he lived in Oakland, California, where he pursued his profession and had an extensive practice. Dr. Newcomb lived to a ripe old age. He outlived his other scientific or rather conchological friends; Gould, the elder Binney, Anthony, Bland, Reeve, Cuming and others of England who were also his friends and correspondents. For many years he lived in the Sandwich Islands and there had excellent opportunities for collecting not only the beautiful land shells of that remarkable insular group, Achatinellæ, the geological distribution of which is nearly if not wholly confined to said islands, but also many interesting and attractive marine and fresh water species. Dr. Newcomb improved the opportunity to make not only an exhaustive collection of the Achatinellæ, but also to make a thorough study of these somewhat variable and therefore difficult shells. By careful comparisons he reached conclusions which are probably more correct than the greater portion of the work of others in the shells of this group.

At the time Dr. Newcomb resided in the islands the Achatinellæ were abundant, and therefore he had no lack of material. Since and of late years, with the clearing of the lands and the development of agriculture, these shells have been gradually, even rapidly decreasing, and now have, it is said, ceased to be numerous. Dr. Newcomb described many new species, and had a very fine collection of these forms. His residence in the islands also gave him unusual advantages in the way of obtaining shells from the whaling vessels which at that time made Honolulu a base for supplies, etc.; and, again, from his missionary friends who were established in other islands near or remote, who occasionally visited Honolulu, he received many additions to his collection of much value. As Dr. Newcomb was always liberal in explaining and giving outright his simple specimens, he naturally received from many grateful recipients of his favors whatever they could furnish that might be desiderata to him. He also, as before stated, reckoned many well-known and leading conchologists among his correspondents and friends, and Cuming especially contributed many rare and desirable specimens to the Newcomb museum in return for what the Doctor had sent to enrich the Cumingian cabinet. After Dr. Newcomb came to California and made Oakland his home, he continued as before with unremitting effort to add to his already large and valuable collection by collecting himself the shells of the Pacific coast, and by encouraging and assisting others to do the same. He described several species of West American land and marine shells and his conchological papers were published in the proceedings of the *California Academy of Sciences* and elsewhere.

The good Doctor also collected in

the field at all the principal points on the coast of California on both sides of the Isthmus of Darien, viz., Panama and Aspinwall; in the San Domingo and on both coasts of Florida, and quite likely elsewhere.

I shall never forget a little trip to the coast made by Doctor Newcomb and myself about 1867. We were led to investigate the neighborhood of Bodega, Calif., and had a tiresome ride one day by stage to the 'Corners' (Bodega Corners) where we had to stop over night before we could go on. We had an uncomfortable room together on the ground floor of the only public house there, so near the bar-room that we were kept awake long after we had gone to bed by the loud talk, wrangling and profanity which surpassed in volume and unceasing flow anything I had ever before experienced. The next morning we were both glad to get away from such a 'hell-hole,' and after paying our bill the Doctor remarked to the landlord that he had never been in a place where such gross profanity prevailed, and he hoped never to have such an experience again.

The landlord was so abashed by my friend's comments and rebuke, that not only he, but some of the rough looking loafers sitting near, really appeared to exhibit some shame. After leaving we proceeded by stage to the Head, as the bold granite bluff is called, that makes out into the ocean in this neighborhood, and soon reached the house which was to be our base. Our stay in this region was not very satisfactory. All the time we were there the wind and sea were rough, and it was dreary and chilling in the extreme, and the collecting ground we found to be quite limited. At low tide we obtained specimens of Macoma nasuta and M. Secta var edulis, also Tapes Pettitti from the same hole and at the same time by digging in the mud, Lasea rubra was also abundant; an occasional red abalone (H. rufescens) was met with, and I had the pleasure of finding a few specimens of Trivia Californica (which I had previously detected alive at Monterey) among the smaller drift of the beach. Near the Trivia, as I had anticipated, I got a few specimens of the stumpy corals that I discovered the Trivia to be parasitic upon at the more southerly point. But it is not so much for the rehearsing of the "finds," as for another matter, that has led me to mention the Bodega trip.

While climbing over the bald and rocky Head, which has been roughened all over like a coarse rasp or file, by the weathering out of the softer components, leaving the harder quartz portion sticking out all over the surface in jagged tooth-like projections, hunting for anything in our line and getting nothing but some peculiarly rough specimens of Littorina planaxis; I heard a cry or call from the Doctor, and on looking up was unable to see him. He was not in sight; but a minute or two before he had been nearly at my side. For a moment my heart stopped beating; I thought he had fallen, or been washed or swept into the ocean. On scrambling over the rocks, I saw him just "picking himself up," a wave of unusual height and volume had struck him behind as he stood with his back to the sea, and had thrown him forward and down with great force, his hands, which he had extended to save himself as he fell, were badly cut by the sharp points of the quartz, and were bleeding considerable. It was bad enough as it was, but the shock I received at his momentary disappearance on that occasion, has remained as the chief souvenir of our Bodega expedition, which was altogether an unprofitable affair. Though the northerly distribution of Trivia California was by this visit shown to be a hundred miles further north than before credited.

As is generally known, many years ago the Newcombian Collection was purchased by Ezra S. Cornell, for the Cornell University, at Ithaca, N. Y., and Dr. Newcomb was retained for many years as custodian.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

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NOTES.

Our subscribers will please note we have sold our entire stock of Naturalists supplies to Messrs. Kerr & Perham of Blencoe, Iowa and Sandwich, Ill. This enterprising firm have stores at both places and are prepared to fill orders for all kinds of supplies needed by naturalists. Give them a trial.

We offer our entire stock of minerals and fossils for sale at a very reasonable figure. We intend to devote our entire time to shells and must have the room taken by these departments. Our minerals occupy some 125 mammoth draws and we have from 8000 to 10000 good fossils on hand. Any one interested please write us at once. There is only one house in the U. S. that we know of putting out good systematic collections of minerals, rocks and fossils. Many firms handle minerals and put out collections but every High School and higher University want and must have a systematic collection of minerals, and with it collections of rocks showing the geological formations, and of fossils showing the life on the earth during each period. Any one who would get out a good collection of minerals, rocks and fossils as above outlined to sell at about $50.00 to schools could sell hundreds of them. There is no such thing on the market. To be successful one must have a taste for the work he engages in and while we are a great admirer of all scientific material we have our special choice the same as every one else and have firmly decided to carry a more complete stock of one line rather than a less complete stock in many lines.

If you have a desire to engage in the sale of minerals, rocks and fossils, it would pay you to come on here and see what we have

We wish to thank our many patrons for their generous purchases in fine shells during the past few months. They have far exceeded our expectations. Our stock is still very fine and we can offer some choice specimens. We are negotiating for two new collections also have an order in for a big lot of choice polished shells from Europe. All polished shells come from Europe where labor is *cheap*. We are buying in *big quantities* direct from headquarters and paying no jobbers profits. We can sell to you as low as any dealer in America *for the same grade of goods*. Of some shells there are as high as 10 sizes and grades. Don't condemn prices, never, where they come from a reliable house until you see the specimens.

We have an interesting letter from Mr. F. P. Browne of Providence, R. I. relative to his recent trip to the Gallapogos Islands with the Rothchild expedition. We quote at some length from it in another column.

Through oversight our article in last months number on the Migration of

Birds should have been credited to the *Maine Sportsman* of Bangor, Me. This journal devotes two or three pages each month to ornithology, the matter being contributed by the United Ornithologists of Maine, which has now grown into a strong organization.

Many collectors are writing about Davie's "Nests and Eggs" and some dealers are advertising it as if they had it. No one has any copies for sale yet. There has been some hitch between the editors and publishers and no one has any copies ready to deliver. We shall have them as soon as anyone. For $2.25 we will give one copy and two O. and O. Manuals. No money required until books are delivered. Simply send us your order.

Without attempting to rival the function of the newspapers in getting the latest news, "The National Magazine" for March has an exceedingly timely article upon "The Situation in Cuba Today," by Elbert B. Hastings. It is very evident that the article was in type at the time of the Maine explosion—but the situation had been so carefully forecast that the explosion incident had the continuity of a sequel rather than an addenda. The article is handsomely illustrated with drawings and photographs and is decidedly vigorous and picturesque. The positive position is taken in forecasting the ultimate freedom of Cubans through the United States, acting as arbitrator on the questions in dispute. While not compromising the views of the patriotic Cubans, there is a judicial fairness in the article that commands respectful attention.

No one who is interested in the best contemporary French literature can afford to miss the series of sketches and stories of Paul Bourget, which will begin in *The Living Age* for April 2. These sketches have been but recently published in France, and this is their first appearance in English dress. They are translated for *The Living Age* by William Marchant. They are extremely clever and characteristic.

Geology.

We often see people in their leisure hours, wasting their time away in frivolous pursuits when in the way of collecting and studying the objects of nature, which are scattered in such profusion on every side—they might add to their education by the perusal of "Nature's story book."

A collection once started may not advance as fast towards completion as we might wish it to but even imperfect as it may be it will always be a collection of souvenirs of the present as well as relics of the past.

Each specimen may have scores of little reminiscences attached to it. Here for instance in our cabinet is a *Delthyris* with its well written history of past glory. What wonderful things might it tell if it could speak of how it spent its life in some snug nook at the bottom of the old-time ocean, surrounded on all sides by the marveloes life of tropical seas, hemmed in at the north by desolate mountains while to the south spread the unbroken expanse of a shallow ocean.

Now besides the recollections of the past that envelop this little mollusk, there always clings to it too the remembrances of a delightful summer excursion to Old Fort Erie in Canada. And so it is as we go, so may we collect and be well repaid for so doing. Every picnic or excursion that we may "take in" we may always find something new in the way of specimens.

In this part of the State the popular place for summer picnics is along the shores of Lake Erie; the cliffs of this shore for many miles are of those rocks which belong to the Hamilton group, and coupled with this is the fact that there are numerous detached boulders of the Upper Helderberg period brought down from the northward in the Glacial period, thus making it a fine collecting ground for the student of geology.

How could a collector place any value in dollars and cents on specimens found on such occasions with their halo of pleasant incidents which invest them and recollect the pleasure with which he traversed the shore of a fresh water lake of today, directing the strokes of his obedient hammer on the rough side of a suspicious looking boulder and then as the rock-pages broke asunder the curious delight of gazing on forms that mortal eye had ne'er gazed on before!

How in the wondrous profusion with which the ocean forms of a long-ago age strew the shores of this great lake of today, do the old and new so strangely meet. And the shells that had their being millions of years ago, then sealed in their rocky tombs to be found again and rescued by the relentless waves of Lake Erie and cleansed and polished anew by her waters, she placed them before us side by side by her own product, the fresh water shells of today.

Let some of our skeptical scientists try to find that the rock record is antagonistic to the masonic record if they wish, but the deeper the unprejudiced mind delves into the enduring records of nature the firmer will be the conviction that the world and "all living things depend on one everlasting Creator and Ruler."

Let all who may contemptibly cry out "Back to Dogma" when a true scientist may testify to the belief in the existence of an intelligent and designing Creator, we will still believe that the "existence of a first cause is the creed of reason."

And like as these beautiful forms venerable with years, are born by the never tiring waves of Lake Erie from their honored tombs to feel the rays of a sunlight that has not kissed their pearly forms for countless ages, so does the greater share of students believe that the One who ever rules, all this, will rescue the human forms of our age from "Time's remorseless sea," when

"Dawns the day that will never know declining."

Pileated Woodpecker in Mahoning County, Ohio.

(*Hylotomus pileatus.*)

One who has never made the acquaintance of this royal Woodpecker "log-cock" cannot know what he has missed. He is an inspiration to the lover of the wild life of the woods. You will not be apt to find him in a neatly trimmed grove or upstart of second growth timber. No votary of civilization and luxury he, but "a chip of the old block" of primeval savageness rather.

It was a red-letter day when I discovered the pair in a heavy woods not a mile from my country home! We are always discovering that we are richer than we thought. Surely, we say, no new thing can come to me; I know all about these fields and woods:—So I thought, and yet, I found that this regal Woodpecker had been living in my horizon for at least a year, and that I had heard his vigorous hammering all that time without really knowing who was the author. But one day, I said to myself, I must go and see what manner of Woodpecker that is,—either he is a most vigorous bird or his sounding-board is uncommonly resonant. I had never seen the bird at liberty, heard its drumming, or dreamed that it could possibly come under my observation here. But when I had reached the woods, and heard the powerful noise reverberated by the quiet autumnal woods, my suspicions were at once aroused. I knew no Woodpecker of my acquaintance could make such a noise as that.

And while I was still some gun-shots away, I saw a dark bird nearly black, as seen in the dim light of the woods, drop into the air from the moggy top-branch of a lofty tree, and in grand wild waves of motion after the manner of his tribe, gallop off through the twilight of the forest into the maze of

great gray tree trunks. He seemed as black and as big as a Crow, and half audibly to myself I muttered "*Hylotomus*, the feathered woodcutter." And it was as if a breath or spirit of times and things gone had started out of the silence of brooding shadows; and my heart beat a little faster, and I was lead on in a wild chase which was to end with a better view of this rare avis.

And again I entered the woods with my telescope, and at last was successful in getting several good views of the pair. And if one has never seen one of these grand Woodpeckers, "at large," it is worth any amount of tramping and care to find them in the setting of some fine remnant of "the forest primeval;" to hear the lusty cry of the male, and his roll-call on some old stub, of some frozen still day of winter, say, when the frosty heart of every tree about, pays back a sympathetic echo to the wooden music; and to see the great black form gallop away, now across the opening in the light of day, now blacker through the shadows, now in the light again. To me, at least, this was a memorable experience.

Well has Dr. Elliott Coues characterized this as "a very wild, wary, and solitary bird." Farther on he says, speaking of the nest, "usually at a great height; the taking of the eggs is something of an exploit," which I can well believe having seen several holes, undoubtedly of this pair by their great size, up almost limbless trees and snags from 50 to 70 feet, where one would scarcely care to risk his bones in climbing after the oological treasures.

The male stops hammering on his favorite trees when nidification begins and is silent till the middle of summer when the brood is probably old enough to shift for itself, when early and late I have heard his noise, the first thing in the morning upon awaking, and all day. While on still damp days his hammer could easily be heard a mile away. I regret that I could not watch this pair closely during the nesting period, when work of this kind was impossible for me.

But this rare bird is so nearly eliminated from the avifauna of Ohio that any notes of its last appearance cannot but be of interest.

Mr. Oberholers in his valuable "Preliminary List of the Birds of Wayne County, Ohio," records the last known specimen taken in that county for about 1883.

Within the last year much of the heaviest timber of this neighborhood has fallen to the greed of gain and the relentless hunger of the portable sawmill, and I have searched the old haunts and listened in vain for the one real relic of the wild days and scenes where the "red-skin," braves, buffalo, and "log cock" formed part of the primeval vastness.

A few figures of the wood-cutting of this feathered woodman will prove how deserving he is of his Greek name —*Hylotomus*.

In passing through the woods inhabited by these birds, I one day came upon a bass-wood tree 17 inches in diameter in which had been located a colony of black ants. Two of these holes made on the north side of the tree measured respectively 6 inches long, $2\frac{3}{4}$ inches wide, $7\frac{3}{4}$ inches deep; 5 inches long, 3 inches wide, $6\frac{1}{2}$ inches deep. The hole on the south side of the tree was $4\frac{1}{2}$ inches long, $2\frac{3}{4}$ inches wide, 5 inches deep. The abundance and size of the chips scattered around gave the place quite the air of a workshop. Fragments were tossed six feet from the tree. One of these chips was $2\frac{3}{4}$ inches long, $1\frac{1}{8}$ inches wide, and $\frac{1}{4}$ inch thick. Another was 4 inches long, and though there were many of similiar size, yet these were the largest. This tree was not rotten but solid wood. It is interesting to note that each of these three holes struck the nest at a different point, but that they all touched the heart or main chamber of it. How were they

able to strike so perfectly the core of the community? Was this the mission of the Pileated Woodpecker, to keep the black ant, which is a great destroyer of old and heavy timber, in check?

—Elaborated from notes read at the last meeting of the Ohio State Academy of Science at Columbus, Ohio.

E. W. VICKERS.

Klickitat Indian Dice.

Recently it was my good fortune to come into possession of a set of four Klickitat Indian dice which are very rare, and in fact the only ones I can find any trace of. I obtained them from a friend living in Oregon, who had procured them from a full-blood Klickitat Squaw, a member of the great western tribe, the Nez Perces.

The substance of the information concerning them was given to me as follows: The squaw he obtained them from was of a more garrulous nature than those of her tribe usually are, therefore she explained in great detail how the game was played. Her husband, who is a Cowlitz, verified her statements The dice are four in number and are made of the incisors of the Beaver. The two marked with five spots are the Queens and the two with only one spot and the cross lines are the Kings; one side of each is blank. The ends are plugged with bits of wood and bound with sinew.

In playing the game, as many may participate as is agreed on, each taking their cast in turn. A soft skin of blanket is used to throw them on, and one cast determines the player's luck, unless there is a tie and then another cast is taken to decide who is winner. The highest cast is four blanks.

Three blanks and King.

Three Kings and Queen.

Two Kings and two Queens.

Two Kings and two blanks.

Two Queen and two blanks.

Two Kings and one Queen and blank.

Two Queens, one King and one blank.

Two blanks, one King and one Queen.

The throws are given in their relative value, the first being the highest and graduating down to the lowest—two blanks, one King and one Queen—which counts nothing. The winner of the stakes in each case takes first throw in the next cast of the dice.

The Squaw says she remembers seeing the game played when she was a young girl, and that must have been a long time ago as she is very old now.

The gentlemen from whom I obtained the dice says that he has been unable to find any such gambling device mentioned in the Smithsonian reports and as I have made diligent search for information regarding any other set that might be in existence have been unsuccessful. I have good reason to believe them a great rarity. I have good proof of their authenticity. Any information the readers of THE MUSEUM may be able to give, concerning any other set of these dice will be highly appreciated by the present owner of the set.

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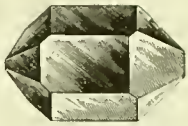

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THE MUSEUM.

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The Sea Anemones of the Atlantic Coast.

To all frequenters of the sea shore during the summer months who take pleasure in seeking and studying the many wonderful and beautiful inhabitants of the ocean, the modest and retiring Sea Anemones cannot fail to offer many attractions; and there are few marine creatures that can so easily be reconciled to the narrow limits of an aquarium and so readily become permanently established in their new home. Thus they afford us every opportunity to study their habits and structure, and to watch their ever varying forms and beautiful colors. But to see them in their perfection one must visit them in their native haunts in some cool rock pool overhung with projecting ledges and drooping sea weeds, or in some deep grotto among the shattered cliffs half illumined by the sun beams which struggle for entrance through the Coral sea weeds that hang from the rocky roof dripping with salt dew. In such favorite retreats the *Fringed* Sea Anemone, *Metridium marginatum* make their home and rear their numerous families, year after year, until every nook and crevice is fully occupied and even the entire floor is fully carpeted by their soft, delicate tufts of tentacles. In such localities it is common to see specimens of every variety of hue from pure white, pink, salmon, chestnut, orange, yellow and light brown to dark umber; while others will be mottled or variously stripped with two or more colors. These colors, however, are those of the outer wall of the body. But the upper part of the body and the innumerable tentacles have lighter and more delicate tints, and this combined with their translucent texture, gives to the summit of the body and its broad crown of fine tentacles a peculiarly graceful appearance, which is much increased by the numerous deep frills into which the tentacle crowned margin of the disk is always thrown in the large specimens. The tentacles are also frequently banded with white. It is always difficult to decide which specimens in one of these numerous colonies is most beautiful when all are so attractive. But the pure white ones most frequently suffer for their beauty, and are borne away in triumph to new homes, which perchance, prove in the end less happy and pleasant to them than the home of their youth.

The Fringed Sea Anemone is not found exclusively in such places as described, but may be found on almost any rocky or ledgy shore along the coast of New England, and in fact from New York to Labrador, snugly encounced in the crevices between boulders or on their under surfaces, wherever there is sufficent space to extend their tentacles and complete shade from the suns heat. For although these lowly organized creatures have no eyes, or even nerves, they are very sensative to strong light, and love the shade. They may also at times be found clinging to the piles of wharves, and on small stones and shells wholly unprotected. Near Mt. Desert Island I once saw during a very low tide, a large surface of rocky bottom so completely covered by them, that the foot could not be put down without crushing many noble specimens. A single stone, the size of a mans head, taken from this place, was found to be the residence of sixty individuals of all sizes. They sometimes occur at a greater depth than 25

fathoms but are frequently found between high and low water mark, both in pools and in places where they are left dry for an hour or more, where they hang relaxed and flabby until the tide returns, when they quickly revive. To remove large specimens of this species from their favorite rock, without serious injury, is no easy matter; for although they are not permanently attached but are capable of moving freely about by gliding along upon their large, high muscular adhesive base, yet when disturbed they cling so closely and firmly to the rock, that they are very likely to be torn open upon the base, rather than loosen their hold. But if the rock be tolerably smooth, by gradually and carefully starting them up by pushing with the thumb nail or some dull instrument against and under the base, they may finally be safely removed. If broken open they will never recover or heal, though they will usually expand and appear very well for several days.

In the confinement of an aquarium, or even in a jar or bowl of sea water, one of these Actinias will soon make itself at home, and, fixing itself upon one side of the vessel by its base, will expand its feathery plume of tentacles day after day in search of tiny prey, and woe to the unlucky creature, be it animalcule, shell fish, shrimp or fish, that comes in contact with its crown of gorgous tentacles armed with myriads of poison-darts, deadly to all creatures destined to be its prey! When fully expanded, this species has a very graceful form which cannot fail to please any one who has a taste for the symmetry and beauty of natural objects. From the slightly expanded base the body arises in the form of a tall, smooth column sometimes cylindrical, sometimes tapering slightly to the middle and then enlarging to the summit. Towards the top of the column is surrounded by a circular thickened fold, above which the character of the surface suddenly changes, the skin becoming thinner and translucent, so that the internal radiating partitions are visible through it. This part expands upward toward the margin, which is folded into several deep undulations or frills, and these edges are covered everywhere by an immense number of fine, slender crowded tentacles, which also occupy about half the width of the oval disk but increase in size and diminish in number towards the mouth, which occupies the center of the disk. The mouth is oval and its lips have numerous folds. It opens directly into the stomach, which is a simple sack suspended in the center of the body, having a small opening in its lower end, through which the products of digestion are poured into the main cavity of the body, while the hard or undigested parts of the food, such as shells bones, etc., are cast from the mouth. The whole interior of the body, between the stomach and exterior, is divided up into an immense number of narrow chambers, by these muscular partitions which radiate from the center toward the exterior, and are of various widths, some reaching from the wall to the stomach and serving to support it, while others extend only a little way inward from the outer wall; each tentacle is hollow and is a a direct continuation of the radiating chamber below it, so that there are as many chambers as tentacles, and of course twice as many radiating partitions as chambers. The digested food, mingled with sea water, serves for blood, and fills all the chambers and the main cavity of the body below the stomach; and as there is no heart, the fluid is put in motion and circulaton through every part by means of myriads of minute vibrating lashes or *cilia*, that cover all parts of the interior surface, and this same surface of soft membrane has the power of absorbing such nutritious substances as each organ may require, from the fluid that bathes it, and also the oxygen contained in the sea water. Indeed it is probable every part of the surface,

both external and internal, has the power of absorbing oxygen; but it is reasonable to conclude, that this takes place most rapidly in the tentacles and internal membranes where the structure fs most delicate.

We usually notice, when trying to remove one of these Actinias from its rock, a large number of white thread like organs emerging both from the mouth and minute openings through the sides of the body. These organs appear to be for the defense of the creature, since they are found to be composed almost entirely of minute poison-darts or lasso-cells, arranged side by side, and having a deadly stinging power when used against small animals. In fact there are very few of the predacious marine animals even not excepting the voracious fishes, that have the temerity to attack one of the harmless looking Sea Anemones; for though their darts may not have sufficient power to kill a large fish, they will, at least, penetrate the thin membranes of the mouth and produce a severe stinging, like that of nettles. And since these stinging threads may be thrown out copiously, and are several inches long, they are very effectual organs of defense. The inner ends of the threads are attached the free edges of the radiating partitions, and the free ends are thrown out simply by the contractions of the animal and consequent expulsion of the fluid contained in its body, which, as it rushes out of the mouth and through the loop holes of the sides, carries with it the thaeads. When the Actinia is again left in repose, it gradually draws in its stinging threads. The little poison darts, usually called lasso-cells which cover both these threads and the tentacles have a wonderful structure for organs so minute. They consist of little vesicles or cell filled with fluid, and have a very long, extremely thin tube, coiled up in the interior. This tube is continuously with one end of the vesicle that contains it,so that when the vesicle is compressed or contracted the fluid forces out the tabular dart by turning it inside out, as one would turn the finger of a glove. The slender tube, when thrust out, is very long, slender and pointed, and usually curiously and wonderfully barbed. The nature of the poison, so deadly to small animals, which these darts emit when they penetrate the flesh, is still unknown; but whatever its nature it must be very powerful for the quantity is necessarily excessively small. The tentacles not only capture and kill the prey by means of these organs, but by means of the darts, that thus penetrate in large numbers, they hold it firmly until conveyed from the tentacles to the mouth. Among our native Sea Anemones there are no species that have darts powerful enough to sting the hand, though some species like the star anemone, will often adhere so firmly, if its tentacles be touched by the finger that it may be lifted from the water before it will loosen its hold. This adherence is doubtless due to the many lasso cells that partially penetrate the epidermis or outer layer of the skin, but have not power to enter far enough to reace the sensative portion. But the common, large, red Jelly-fish (*Cyanea arctica*) has similar poison darts covering its long, floating, thread like tentacles, which are powerful enough to penetrate the human skin, and sting far more powerfully than nettles. And among the coral-roofs of Florida and the West Indies there are corals (*Millepora*) which, unlike most corals, have animals belonging to the same class with the Jelly-fishes, on their tentacles have poison darts, which according to the observations of Prof. Hartt, sting the parts of the hand where the skin is most delicate very severely. The same is true of some other *Hydroids*, which do not form coral but grow in mass-like tufts. It is also said that some of the foreign Sea Anemones have the same power of stinging the hands, and especially

those of persons having a delicate skin. But certainly no such charge has ever been brought against our native species.

The Fringed-anemone makes a very pleasant pet in confinement, aud if allowed plenty of room and fresh sea water, will expand almost constantly. It feeds readily upon the flesh of all sorts of shell fish &c., and will not refush bits of raw beef, and if necessity compels, it will live for months and even a year without food; but curiously enough it will continually grow smaller and smaller, so that a specimen at first five or six inches high and two in diameter, may thus be reduced to the height of an inch and the diameter of less than half an inch, the numbers of tentacles and chambers being proportionately reduced. In fact, under such circumstances, the animal seems to undergo a retrograde process, exactly the reverse of that by which it originally developed from youth to maturity.

The ovaries of Actinias, and all similar animals including the coral-polyps, are attached to the inner edges of the radiating partitions below the stomach and are filled with immense numbers of eggs, which are discharged when mature directly into the fluid filling the body, and then are either discharged very soon from the mouth, or are retained for a longer or shorter time until they are hatched into minature Actinias, which are discharged in different stages of development and of various sizes; but however small they may be, they are perfectly competent to take care of themselves from the start. The Fringed-anemone, and some other kinds when they remove from places where they have long been stationary are liable to tear off and leave behind them little fragments from the edge of the base, but every one of these fragments will in a few days develope a little mouth and a row of tentacles around it and will soon become a perfect little Actinia, differing only in size from the parent. The same effect may be obtained at will by cutting off little portions from the edge of the base with a sharp knife. This process is evidently analogous to the wonderful powers of restoration and development of mutilated and lost parts, so well known by experiments upon the fresh water Hydra and other low animals, some of which may be cut up in every direction into many pieces, and each part will still restore all the parts that are lacking. It has, also, some analogy to the process of budding so common among the coral-polyps.

(To be concluded in June number.)

Galapagos Islands.

Part of a letter recently received from Mr. F. P. Drowne, who was a member of the Rothchild Expedition:

The Galapagos islands, which were visited by our party, are about 600 miles west of Ecuador, and lie nearly on the equator, the extreme islands being about 100 miles north and 100 miles south of the line. They are of volcanic origin and volcanic action has been so recent that a large portion of the islands consists of barren low fields.

Vegetation is limited and little is found of a really tropical nature except on the tops of some of the peaks, the tallest of which reach an altitude of some 4000 feet. The lowlands are covered, in places, with a thick growth of cacti and dry brush, which, combined with the rough walking over lava, made collecting difficult

With such a limited vegetation one cannot expect to find a very large assortment of birds nor did we. The land birds with a few exceptions were plainly colored, belonging principally to the families *Geospizæ*, *Camarhynch*, *Mimidæ*, and *Pyrocephali*, the members of each family differing from one another chiefly in measurements of bill and tarsus.

The tameness of the large sea birds (boobys, albatross, frigate birds, etc ,

breed there in thousands was remarkable. Probably they had never before been disturbed by man. We collected a great many of our specimens with sticks and could have caught them in our hands had we so desired.

We had quick trips both ways. 35 days from San Francisco to the islands and 41 days on ths return voyage where we encountered a great deal of bad weather. No one was seriously sick on the trip although "yours truly" had a terrible struggle with Neptune soon after leaving port. Over 3000 bird skins, about 65 large tortoise and a mass of miscellaneous material was secured.

Notes on the Taking of an Egg of the California Condor.

We have recently received a fine egg of the California Condor from one of our California correspondents and thinking a short description of the finding of the egg would be of interest to our readers, we copy from his letter:

"The egg was found on the 29th day of April, 1897, and was fresh. For some time I had noticed a pair of Condor sailing around a certain canon near my home and felt sure they had a nest somewhere in the vicinity. Several trips were made exploring the different cliffs but for a long time I was unable to locate where the nest was. Finally, I made up my mind that a certain cliff, over 300 feet high, in which were one or two caves that I could see, must contain the egg. To climb the cliff was impoesible, but by climbing as near the top as possible, from adjoining cliffs, and watching the action of the male, I felt certain that the female was somewhere in the hidden recesses below. I procured a liberal supply of rope and after getting as near the top as possible, I fastened one end of the rope to a heavy stick and placed it solidly between two rocks, then by going down the rope hand over hand for forty feet, I was able to touch a ledge where I could walk along for some distance. While going down I was agreeably surprised to see the female bird fly out and past me from a certain recess in the rock. After touching the ledge I walked some little distance and found the egg neatly hidden in a cave of rock. This cave was twenty feet high, the bottom covered with loose stones, gravel and some sticks, but no arrangement of a nest was made, and I am inclined to think that the sticks were not carried there, but had fallen from time to time from an adjoining pine tree which grew near the mouth of the entrance and completely hid the cove from view. I had no idea there was a cove there until I went down the rope.

After securing the egg and carefully packing it in a box which I tied over my shoulder, I started the ascent of the rope. Anyone who has attempted to climb by a single rope for forty feet, knows what kind of a job I had on hand, but after hard work, succeeded and reached the top and then made my way carefully to terra firma. It was the hardest piece of work I ever tackled to secure a single bird's egg, but I felt repaid after all. If I ever make the climb again I shall provide myself with a rope ladder and make the ascent a little easier.

These birds used to be very common in the mountains, but for some years past one seldom sees a bird, and the job of finding a nest will wear one's patience out. In this case above described it was by the merest accident that I found the birds, as I have hunted many times for them.

If any of my brother collectors find a nest of this rare bird I should like to see a short description of the find in the MUSEUM. My egg was secured in Santa Barbara county, California.

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Sea Horses.

The remarkable Order, called by naturalists *Lophobranchs*, differ from all other Orders by curious distinctions. They differ from the fish in the peculiar structure of the gill arches, by which the gills are arranged in little tufts on each side of the head under the "cheek" bones or gill covers. Hence the name *Lophobranch* which is derived from the Greek, signifying *tuft-gilled*. But perhaps more curious is that distinction drawn from their mode of reproduction; a trait so strange as to suggest the seemingly abnormal habits of the Marsupial,—the Opossum and the Kangaroo,—although the eccentricity of the fish is far greater than that of the land Marsupial; for, in the latter, it is the female whose pouch receives the immature young, and which are therein nourished to complete their development. The parental relation of the female *Lophobranch*, however, is restricted to the simple emission of the unimpregnated eggs. Beyond this, maternity she has none. The male is really and literally father and mother to the progeny; and so far as the reproductive instincts are concerned, it would seem that the female manifestation is summed up and exhausted in the one solitary and singular act of a formal consignment of the ova to the embryonal sack of the male.

There are many species of the *Lophobranch* but they are all referable to to three principal groups, of which the Flying Dragon (*Pegasus*), the Sea Horse (*Hippocampus*) and the Pipe Fish (*Syngnathus*) are types. The following observations were made upon the *Hippocampus hudsonius*, De Kay, or the common Sea Horse of the Atlantic Coast of the U. S.

For many years I had been studying the Sea Horse as opportunity occurred but owing to difficulties to tedius to detail, nothing like gratifying success was attained until one day, a weterman brought me two full grown ones and to my joy they proved to be "gravid" males. Alas! my oft repeated experience returned; for owing to the shock produced by the ordeal of acclimation, they began to involuntarily emit their young. None but a working naturalist can appreciate the anxiety I then suffered. The next day one of my hypos died, having from debility set free all its immature young, which were sufficiently developed to indicate plainly their family relation. My estimate was that they were twelve day embryos. I now redoubled my efforts to invigorate and save the remaining adult, by solicitously watching every circumstance of temperature, æration and light. In spite of all, the emission of the young went on, until instinct prompted by increasing debility, led the parent to expel the rest by voluntary effort. *How* this was done was a great point gained. Except a few floating fronds of Ulva, other than the fish, there was no object in the water. And

here the structure of the Sea Horse's tail must be borne in mind, so unlike that of any other fish, covered with an envelope consisting of bony scales; four-sided, and suggesting a small square file; in faculty, prehensile like that of some monkeys, and of considerable length. Binding this appendage upward like an inverted crook, thus imparting to it muscular rigidity the animal pressed it against the bottom of the embryonal pouch, which occupied the lower part of the abdomen thus pushing its contents upwards, and forcing them out of the opening on the top of the sack; the creature all the time sustaining its normal, erect position in the water. The extruded young immediately perished. Relieved of his charge my hippo soon recovered strength, and became for several months an interesting pet.

On the 8th of September fortune smiled and brought me another "graved" male Hippocampus. This also, under the weakening effect of acclimation, began excluding the young and emitted a full dozen. Circumstances favoring and profiting by a varied experience, I was enabled to carry my new Hippo safely through the dreaded ordeal. Most anxiously was he watched day by day. To my astonishment no enlargement of the embryonal sack could be detected. I supposed that as the young increased in size, the distension of the pouch would go on equally. Again my apprehensions was aroused, for I feared all were dead.

September 21st proved a red-letter day. Near noon I observed three young Sea Horses swimming about. They had just made their *debut*. Very minute creatures they were; but, to my great joy, nearly perfect. From that hour the *Pater-mater* kept busy setting his progeny adrift. At the bottom of the vessel was a broken winkle shell, put there for the attachment of the animal's tail, when fatigued by swimming, as the Sea Horse is very easily tired, and this, monkey like is its

Sea Horse.

favorite mode of taking rest. The Winkle afforded real help in the labor of extruding the young, which is in no sense a parturient process, but on the contrary is entirely mechanical, and in the present case was effected in the following manner: With its abdomen turned toward the shell, its tail attached to the under part of it, the body erected to its full height, the animal by a contractile exertion of the proper muscles would draw itself downwards and against the shell, thus rubbing the pouch upward, and in this simple yet effective way, expelled the fry at the opening on top of the sack. It was said above that the Sea Horse is soon wearied, with even moderate exertion: hence, probably, it was, that these repeated acts were each followed by a few minutes of rest. Indeed the extrusion of its young lasted for nearly six hours, from three to six individuals being set free at a time.

The scene that followed was one of singular and lively interest. I was nervous with delight and wished that

every naturalist could see it for himself. I am sure there is no student of nature but will excuse the enthusiasm which prompted me to write at once to a friend, that "he must set the minister down as a horse-jockey, on being informed that he was now the proud possessor of the most numerous drove of colts ever owned by one man the world over." Using my best judgment, for owing to the mazy motion of this tiny throng, counting was out of the question, I set the number down as not far from one thousand. Each measured from five to six lines in length. Very minute creatures, surely, when one considers how large portion is taken up by the tail, which organ was of but little more than thread like dimensions. We might suppose it would require a few days for the young Hippo to find out the remarkable monkey-like endowment of the tail. Not so, only look at what my own eyes beheld many a time, when a "stampede" of these little colts was going on, although they were but one day old. There came two little Hippos, each swimming at a direction of right angles to that of the other. Just at the point of passing, one lasso-like, whips his caudal extremity round that of his fellow, who of course in like manner, returns the caudal compliment, which to speak technically, acts as a "double lock." Of course both pull, and by a natural law, the force is exerted in exactly opposite directions, and the right angel is resolved into a straight line. It is but poor head-way they make, nor does it mend the matter much, that a third little fellow comes giddily on, and switching his tail, takes a hitch at that precise point in space where the other two met. Now a triple force is exerted, and the effect is, with two straight lines, to project three obtuse angles. And so the three toiled on, obtusely laboring *in stata quo*. But a droller sight is that of yonder juvenile *Lophobranch*, who seems to be of somewhat beligerent proclivites as he is leading by the nose a weaker member of his own species, having with his caudal extremity noosed him on the snout. These funny antics though oft repeated, are of short duration, as the parties soon have to rest from sheer exhaustion.

On the fifth of October the last of my little Hippos died.

In the matter of foetal sustenance, I find a remarkable marsupial analogy in the Hippocampus. The pouch of the Kangaroo and the Opossum contains teats with which, by true lactation, the young are nourished until fully formed. Nor is the embryonal sack of the Sea Horse a mere receptacle or nest, for the hatching of the eggs, the fish does in and by the pouch, supply nourishment to the growing young. The mass of fry on the day of its extrasion is certainly in bulk several times greater than that of the original egg mass. We know that the bear during hibernation lives upon the fat acquired the previous season. During a journey that requires abstinence from food, the well conditioned camel will subsist on the absorption of its fatted hump. The tail of the frog, which has just completed its last metamorphosis. does not pass off by atrophy, but is really a wise provision for the creature's support by absorption, during the few days which constitute the most critical portion of its life.

This fact I have demonstrated elsewhere by observation from the spawn to maturity. But in these and similar cases, the animal is simply nourished by some superabundance in itself. Ruling out lactation, and the placental phenomena of gestation, is there any instance in which, as a normal fact, the young feeds upon the parent? This fact, seemingly so anamalous, I assert for the Hippocampus, although its physiology, I may not be able to explain. The male Sea Horse not only hatches the eggs, in the embryonal pouch, but also feeds the young, by allowing them to absorb a portion

of its self. This is done during the embryos consumption of the placental yolk, and also especially and more rapidly, after that source of food is all exhausted. Of course, upon receiving the ova, the pouch might be supposed to be considerably extended. This distension is really very trifling. And during the development, the enlarging of the sack might be expected; but it is inappreciable. At the time of receiving the spawn the wall of the pouch is less than three lines thick, and well stored internally with fat. At the time of expulsion of developed fry this sack is not half a line thick and hangs flaccid on the animal, a mere thin membrane. In due time it becomes again thick, firm and fat as before, and in such a state has been mistaken by me for a gravid condition. This interesting fact of a true marsupial nourishment, and of so unique a character, although suspected, was not accepted, until established by dissection, and observation of a male that had gone through the course described. Moreover, I believe in part may be thus explained the impulse to that forcible eviction of the immature young, which has been already described. The debility caused by the consumption of the parent, together with the weakening of acclimation, seems to have impelled the act.

But with the exclusion of the young, the marsupial likeness stops in the Sea Horse, although the young pipefishes are said to re-enter the pouch on finding themselves in danger. It is my belief that with the Sea Horse the termination of developments is the end of their solicitude for the young.

The Sea Horse, when taken fresh from its native home, though almost laughably grotesque is a very pretty creature. Its general color, is ashen gray; at first glance, an exceedingly sober suit. But if examined more closely, it will be found thickly studded with tiny spangles of metallic silver. Add to this its rich armiture of quaintly carved tail plated, like a coat of mail, its body almost perfectly erect, and bent forward, it looks like the steed of a knight-errant in quest of adventure; and those pretty, golden, yet queer little eyes, chameleon-like, independent of each other, intently gaze two ways at once. Then as to that dorsal fin, in oddity and beauty it has no competer among its ichthyic rivals, so tastily fringed with a neat border of delicate yellow, precisely like the yellow tipping of the tail of the Cedar-bird. In truth, this dorsal fin is cruelly libeled in every engraving we have seen. It nature it is an exquisite fan, in form, size and ornament, worthy the hand of Queen Mab. In fine, as we look at his equine appearance, and think of his monkey faculty, and his oppossum traits, and queer blending of innocent oddity with patriarchal dignity, we have to accept the old fisherman's proverb, "There is nothing on the land that is not in the sea."

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Milky Quartz	05	1 00
Green Feldspar	05	1 00
Native Sulphur	10	2 00
Talc	05	1 00
Mexican Opal	10	25
" Onyx	05	1 00
Malachite	10	1 00

Crystals.

Amazon Stone	$ 05	$ 10
Amethyst	10	25
Calcite	05	1 00
Cyanite	05	1 00
Dolomite	05	1 50
Feldspar	05	25
Fluor Spar	05	1 00
Needle Tourmaline	05	1 00
Garnets	05	1 00
Quartz	10	1 00

Fossils.

Trilobites	$ 15	$ 35
Scaphites	15	75
Pentremites		10
Athyris Spiriferoides		03
Sea Urchin	15	25
Screws	10	15

Large lot of Museum slabs for sale cheap.

Echinoderms.

Serpent Starfish	$ 10	$ 25
Brittle Starfish	10	25
Lower California Starfish	25	50
Asterias Vulgaris	10	25
" Forbesii	10	35
Nidorella Armata	25	50
Heliaster Kubingii	35	1 00
Black Starfish	25	50
Mammoth Starfish	50	1 00
Club-spine Urchin	25	75
Purple Urchin	15	25
Sea Biscuit	25	50
Phillipine Urchin	25	50
Sand Dollar	05	15
Encope, California	25	35
Key Hole Urchin	15	25
Sea Gopher	25	50
" Beaver	35	50

Shells.

Paper Nautilus	$1 50	$ 5 60
Pearly Nautilus	1 00	2 50
White Murex	10	1 50
Rose Murex	25	1 00
Pink Murex	25	1 00
Black Murex	25	75
Rock Murex	10	35
African Murex	50	1 00
Trumpet Shell	50	5 00
Triton	1 25	2 00
Crown Volute	20	2 00
Mitre	10	50
Foxhead	20	50
Harp Shell	15	50
Marlinspike	10	50
Marbled Cone	10	40
Lettered Cone	15	50
Dotted Cone	05	15
Silver Lip	10	15
Spider Shell	15	25
Hooked Scorpion	25	50
Scorpion	25	75
Angle Wing	15	35
Mother of Pearl	75	1 00

Corals.

Pink	$ 05	$ 50
Red	05	20
Yellow	05	25
Rose	05	35
Propeller	15	75
Plate	35	2 00
Head	50	5 00
Brain	75	10 00
Forking	15	1 00
Mushroon	25	50
Eye	05	50
Precions		10
Coraline		10
Organpipe	10	3 00

Marine Curios.

Hammerhead Shark's Egg		$ 15
Nurse Shark's Egg		60
Acorn Barnacles	$ 05	50
Sea Anemones		50
" Cucumber		50
Squids	50	75
Goose Barnacles	05	50
Alligator, 12 inches		1 50
Sea Horses, good		35
" " imperfect		15
Hermit Crab in Shell		25
Shark's Eggs		10
Devil Fish Eggs		15
Porcupine Fish	75	3 00
Cray Fish	10	25
Tortoise Shells	5 00	10 00
Tarantula	35	1 00
Trap-door Spider		50
Cassia Bean, pkg		10
Black-eyed Susan, pkg		10
Horned Toads		50
Gray, Black, Yellow and Brown-banded Sea Beans, each	03	05
Liver Beans	05	10
Sea Beans, in pod		15
Views of Niagara	10	5 00
Steroscopic Views of Niagara, doz		2 00
Satin Spar Novelties	10	1 00

Eggs.

Many sets and singles at a very low figure.

Additional list on page 98.

FOSSILS!

We offer the following fine fossils for sale at the low prices annexed. All will be prepaid on receipt of price, and any will be sent on approval, if desired. Where sent on approval purchaser must pay Express charges. Send your orders in at once. Teachers who want small assortments of fossils will here find just what they want. In ordering please name a few substitutes if possible, so if we should be out of any you call for, we can put in others and fill your order complete.

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FOSSIL SHELLS

Orthis biforata	$ 05
" lynx	10
" Vanuxemi	01
" occidentalis	10
" multisecta	04
" pecosi	04
" subelliptica	05
" subquadrata	06
" thelmei	05
" flabellites	15
" hybrida	06
" varica	05
Spirifer peculiaris	06
" zlezac	20
" grimesii	50
" marionensis	10
" cameratus	10
" hirta	10
" Kentuckiensis	05
" mucronatus	15
" medialis	10
" lineata	05
Pentamerous galeatus	10
Pentamerella papillionensis	05
Strophodonta inequistriata	10
" demissa	15
" concava	30
Strophomena alternata	15
" rhomboidalis	15
" subtenta	10
Chonites mesaloba	05
" ortoni	15
" granulifera	10
" laevis	05
Tropidoleptus carinatus	10
Cyclomena bilex	15
Aulopora arachnoidea	10
Platyceras equilaterale	10
" nasutum	10
" thetis	15
Leptena sericea	05
" transversalis	05
" subplana	15
Amplexopora discoidea	05
Platystoma niagarensis	15
" broadheadi	15
" turbinata	10
" lineatum	15
Retzia evax	05
" popana	15
Pleurotomaria rotunda	30
" ltys	10
" lenticularis	10
" turbiniformis	10
Mytilarca oviformis	25
Atrypa reticularis	05
" spiriferoidea	10
Rhynchonella missourensis	10
" venustula	10
" stricklandi	10
" neglecta	05
Productus costatus	15
" longis pinnus	05
" nebrascensis	15
" semireticulatum	20
Tellinopsis sunemarginata	20
Athyris spiriferoides	05
" subtilita	15
" hannibalensis	25
Macrochellus Hebe	05
Exogera arietina	10
Derbya robusta	15
Syringothyris textus	30
Atactopora ella ortoni	20
Astylospongia praemorsa	10
Zygospira modesta	05
Goniatites ixion	35
Productella arcuata	10
Murchisonia perangulata	05
" lirata	05
Stomatopora frondosa	15
" inflata	15
Beyrichia oculifera	15
Petigoporo petechialis	05
Streptorhynchus sulcatum	05
Protarea vetusta	10

FOSSIL CORALS.

Favocites occidentalis	20
" niagarensis	15
" venustus	15
" mundus	15
" goldfussi	10
" nitella	15
" Hamiltoniae	10
Monticulipora mammulata	15
" dalei	05
" ulrichi	05
" frondosa	10
" petasiformis	25
" selwyni	10
" subpulchella	10
" ramosa	05
" Andrewsii	05
" decipiens	05
Syringopora verticillata	10
Michelinia expansa	10
" stylopora	15
Hellolites interstinctus	10
Plasmopora elegans	10
Halsytes catenulatus	15
Ptilodictya pavonia	05
Monotrypella quadrata	10
Stellipora antheloidea	05
Stictopora gilberti	10
Zaphrentis spinulifera	10
" prolifica	15
Streptelasma corniculum	15
Leptipora gorbyi	10
Thecia minor	15
Arthropora shafferi	15
Batostoma jamesi	05
Spatiopora tuberculata	10
Chonophyllum sedalliense	20
Ceramopora ohioensis	25
Acervularia davidsoni	25
Stromatopora concentrica	25
Aulocophyllum sulcatum	40
Heliophyllum degener	15
" Halli	15
Cystephyllum americanum	20
Eridophyllum rugosum	10
Trichophyllum venosum	10
Cyathophyllum rugosum	10
Trematopora tuberculosa	05
Callopora aspersa	05
Cystiphyllum turbinatum	05
Amplexus distortus	05
Alveolites fibrosus	10
Cyathophyllum solidum	10

CRINOIDS, ETC.

Blairocrinus bullatus	25
" trijugis	20
" herculeus	30
" arrosus	25
" icosidactylus	35
Eucalyptocrinus caelatus	20
" chicagoensis	20
" ovalis	15
" depressus	20
" crassus	20
" grandis	25
" " roots of, fine	25
Saccocrinus infelix	20
" cristyi	
Lichenalia concentrica	25
Granatocrinus roemeri	15
Agelacrinus cincinnatiensis	15
Pentamerus oblongus	20
Cyathocrinus meeklanus	20
Dotycrinus gouldi	35
Pentremites pyriformis	10
" godoni	10
Agaricocrinus tuberosus	25
Ganrocrinus nealli	25
Platycrinus melissa	25
" eboraceum	75
Lyriocrinus melissa	25
Stems of crinoid, fine	05

FOSSIL LEAVES.

Annularia inflata	20
" longifolia	60
Pecopteris unita	30
Neuropteris hirsuta	25 50
Hymenophyllites clarki	40
Fine assorted lot of Carboniferous ferns from Pa.—nice specimen	10
12, ditto, mostly different	1 00

MISCELLANEOUS FOSSILS.

Many fine things are listed here.

Baculites	25
Phacops bufer	15
Trigonacarpus nuts	10
Scaphites nodosus	20
Innoceramus crispi	20
Taonurus type	15
Oredon culbertsoni Teeth in Jaw one tooth	10
Ditto, two to four teeth	25
Mesohippus bairdii Teeth in Jaw one tooth	10
Ditto, two to four teeth	25
Single teeth, free, of either of above	05
Mammoth Fish Vertebrae, from Kansas	25
Macropuentes brissoides	50
Piece Jaw Bone, with teeth of shark, all in matrix, good	1 25
Lichenocrinus crateriformis	15
Batastomella gracilis	20
Climacograptus bicornis	20
" typicalis	20
Crania scaplosa	15
Pasceolus darwini	15
Tentaculites richmondensis	15
Orthoceras byrnesi	25
Roots of Holocystites	25
Columnopora cribriformis	35
Pterinea demissa	30
Gyroceras cyclops	60
Taonurus caudagalli	30
Chonites ornata	10
Trinucleus concentricus	15
Callopora sigillarioides	10
Rhynchotreta cuneata	10
Lingula cuneata	10

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A	30 stamps, all different, some cataloguing five cents or more	$ 25
B.	30 stamps, all different, U. S and Hawaiians, some cataloguing five cents or more...	25
C.	40 stamps, all different, S. and Central Amer., some cataloguing five cents or more.	50
D.	40 stamps, all different, U S and Hawaiins, some cataloguing five cents or more...	50
E.	60 stamps, all different, and a 25 cents celluloid Grill measurer	75
F.	75 stamps, all different, a 25 cents Grill or Perforation gauge	1 00
G.	100 stamps, all different, 50 of them U. S and Hawaiians	1 00
H.	220 stamps all different, one-half doz. books and 1000 of our best Hinges	1 00

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Contains about 60 British Colonials which catalogue over $1.00; 200 other foreign that will catalogue over $3.00; and U. S. that will catalogue over $2 00. A better packet for the price has never been offered.

PACKET NO. 3.

50 cents or 50 one cent stamps.

This is a LITTLEHUMMER 100 varieties from the same countries as No. 2, but higher priced stamps. You can put 50 in a collection and trade or sell the balance for more than it cost you.

$5 **PACKET No. 5.** **$5**

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The unused U. S. Stamps alone catalogue over one-half the price of the packet.

The used stamps catalogue over $10 00.

It contains stamps from issues of 1847, 1851, 1857, 1861, 1868, 1869 and so on up to 1894, stamps from the departments and a number of scarce envelopes. This packet is a bargain.

PACKET, NO. 2.

50 cents or 50 one cent stamps.

125 varieties. Our cheapest and quickest seller. No cheap countries represented but 125 different stamps from such countries as Hawaii, Brazil, Russia, Great Britain, African and French Colonies, Portugese, Spanish, etc.

50c. **PACKET NO. 4.** **50c.**

British Colonies Only.

This packet should please any one. It contains 60 different British and British Colonies, such as the Canadas, Queensland, Trinidad, Cyprus, Jamaica, Western Australia, New Zealand, Tasmania, New South Wales, Cape of Good Hope, Mauritius, British Guiana, etc.

$10 **PACKET NO. 10.** **$10**

The 1 100 varieties—all different—put up by countries in separate envelopes and enclosed in one packet, a collection in itself. This is a packet that is useful to a small dealer as well as to a collector. It contains a wide range of stamps, including many very scarce and desirable stamps. This is an exceptional offer and we expect this to win us many future customers.

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We buy stamps and old collections for cash Send whatever you have, including duplicates, stating price asked. We exchange stamps also. You must send us stamps cataloguing over 3 cents for which we will allow one-third catalogue price. We will then send our approval books from which you select stamps at our figures which are 50 to 75 per cent. off catalogue prices This is something no other stamp firm will do.

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	PER EGG
Razor-bill Auk, 1-1	10c
Murre, 1-1	10
Calif Murre, 1-1	10
Noddy Tern, 1 1	15
Sooty Tern, 1 1	12
Chachalaca, 1 3, 1-4	12
Calif Gull, 1 5	11
Western Gull, 1-2, 1 3	12
American Herring Gull, 1-3	10
Eared Grebe, 1-7, 1-8, 1-10	05
White Ibis, 1-3	10
American Eider, 1-4, 1 5	12
Royal Tern, 1-2	20
Mallard, 1 7	10
Pintail, 1-7	12
Redhead, 1-6, 1-5	12
Canvas-back, 1-4	30
Common Tern, 1 2	05
Harris Hawk, 1-3	20
Great Blue Heron, 1 5	15
Snowy Heron, 1 1	08
Little Blue Heron, 1 5	05
King Rail, 1-7	08
Amer. Crow, 1-5	04
Short-eared Owl, 1 3	30
Leach Petrel, 1-1	10
Black Guillemot, 1-2	10
White-wing Dove, 1-2	06
Mourning Dove, 1-2	02
Redbill Pigeon, 1 1	20
Grassquit, 1-3	35
Robin, 1-4	02
Redwing Blackbird, 1-5	02
Catbird, 1-4	02
Barn Swallow, 1-4	02
Cliff Swallow, 1-4	02
Song Sparrow, 1-5	02
English Blackbird, 1-4	03
English Jackdaw, 1 5	05
English Green-finch, 1-6	03
Black-head Grosbeak, 1-3	07
Baltimore Oriole, 1 5	05
Purple Grackle, 1 5	04
Bronzed Grackle, 1-5	04
Great-tail Grackle, 1-4	06
Boat tail Grackle, 1 4	06
Ark Gold finch, 1-4	05
Towhee, 1 3	05
Cardinal, 1-3	04
Gray-tail Cardinal, 1 3	15
Brown Thrasher, 1-4	20
Long tail Chat, 1-4	06
Yellow-breast Chat, 1-3	05
Yellow Warbler, 1-4	03
Calif Towhee 1-4	04
Alberts Towhee, 1 3	20
Herr Song Sparrow, 1 3	05
Mocker, 1-4	03
Curve-bill Thrasher, 1-4	08
Sennett's Thrasher, 1-4	08
American Redstart, 1-4	04
Rose breast Grosbeak, 1-4	07
Meadow Lark, 1 6	04
Calif Bush Tit, 1-5	08
West House Wren, 1-6	03
Bairds Wren, 1-5	06
Calif Thrasher, 1-3	10
Wood Thrush, 1-4	05

Some Nice Sets with Nests.

	PRICE PER SET
Brown Thrasher, n-4	25c
Indigo Bird, n-3	25
Song Sparrow, n-4	25
Seaside Sparrow, n-5	50
Wilson's Thrush, n 4	40
Marv. Yellow-throat, n-5	50
Chickadee, n 4	35
Red wing Blackbird, n-4	25
Clipping Sparrow, n-4	20
Cedar Wax-wing, n 4	25
Yellow Warbler, n 4	25
Phoebe, n-5	35
Red eye Vireo, n 2 and Cowbird	25
Grasshopper Sparrow, n 4	50
House Wren, n-7	35
Yellow-throat Vireo, n 3	35
Red eye Vieo, n-3	30
White throated Sparrow, n-3	40
Least Flycatcher, n 4	30
Barn Swallow, n-4	30
Slate colored Junco, n-3 and 2 Cowbird's	50
White-bellied Swallow, n-4	40
Black-throated Green Warbler, n-4	1 00
Rose-breasted Grosbeak, n 4	40
Blue Jay, n-4	30
Kingbird, n-4	35
Purple Finch, n-5	50
Bank Swallow, n 4	30

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We have just purchased a fine Chicago Collection of Shells and have placed same on sale. We are sending them out daily on approval to customers from California to Europe. If you want really nice shells write us now. We cannot list them here. March Museum gave you a little idea of some of the good things we have got. Let us hear from you at once outlining some you might be interested in and we will forward box for examination.

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VOL. IV. NO. 8.

JUNE, 1898.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., JUNE 15, 1898. No. 8

The Sea Anemones of the Atlantic Coast.

(Continued from May number.)

The Star Sea Anemone, (*Bunodes stella, Verr.*), is another beautiful and interesting species, which may readily be domesticated in an aquarium, and proves very hardy in confinement. This species, instead of having a smooth body like the preceding, is covered with little wart-like pustules, arranged in vertical rows, which have the power of adhering firmly to foreign substances, such as bits of shell and sea-weed with which it often so completely covers its body as to effectually conceal itself, when contracted into a low cone among the rocks and gravel where it often dwells. But when it lives, as it frequently does on the Maine Coast in fissures and cavities of ledges, overhung and protected by sea-weed, it usually discards its foreign covering, which now becoming no longer useful, is evidently regarded as a burden. When placed in an aquarium, even if covered with foreign matters, it very soon discards them and appears perfectly clean. The uppermost pustule of each row is larger than the others, and forms an inflated vesicle just below each tentacle. The tentacles instead of being very small and numerous, as in the fringed-anemone, are comparatively few, rarely more thon 72 in the largest specimens, but they are large and often more than an inch long. The mouth usually has the form of a cross, with several prominent folds upon its lips. Its body is usually pale, translucent, olive-green, sometimes approaching flesh-color, and the disk and tentacles have a lighter tint of the same colors, while the tentacles are conspicuously beaded with opaque-white, and upon the disk there are usually six or twelve lines radiating from the mouth to the base of the tentacles. Most of these tentacles have a white heart-shaped spot upon the inner side of their bases.

This pretty Actinia used to be very common at Eastport, Me., and has been found at Cape Elizabeth. In the latter locality the specimens were half buried in sand at the bottom of a rocky pool near low water mark. In confinement it expands most freely in the evening. It feeds, like all other species, upon all sorts of mollusca and crustacea that come within its reach. It brings forth living young, often of considerable size, which emerge at irregular intervals from the mouth, sometimes singly, sometimes in large numbers. It does not grow so large as the preceding, the body seldom becoming more than two inches high and one in diameter, but having more than twice the diameter across the expanded tentacle.

The Red Sea Anemone (*Rhodactinia Davisii, Agas.*) is unquestionably the most beautifully colored and showy of all our northern Actinias; but, although very changable in shape, it lacks the elegant forms assumed by other species. The body usually forms, in expansion, a low cylinder, broader than high, with a broad disk; surrounded by a moderate number of large, rather short, tapering or blunt tentacles. The exterior of the body is sometimes nearly smooth, but at other times a few, rather inconspicuous warts or suckers scattered over the surface. The shore specimens are mostly mottled with deep brownish red and dull greenish, while the tentacles are pinkish banded with opaque-white. The disk is often light green-

ish or pink with radiating lines of purple or deep red, which embraces the base of the tentacles. Occasionally shore specimens are found having the body uniformly bright red, crimson or pink, with a lighter colored disk and tentacles. The tentacles are usually banded with white in all varieties, but are sometimes uniform pink and translucent. Other species often have the body pink mottled with orange red or blotched with crimson. The specimens from deep water have generally brighter and clearer colors than those of the shore, but are quite as commonly found mottled with two or more shades of red, as of uniform red or pink colors.

The habits of this fine Actinia are much like those of the last, and the young are produced in the same manner. It attains a much greater size, for specimens are not uncommon which are two inches high and four or five in diameter when expanded. The largest, however, are apt to be troublesome inmates of an aquarium, on account of their remarkable voracity, for nothing seems to come amiss to them. They will capture and swallow fishes of considerable size, as well as crabs, mollusks, etc., and have even been known to swallow the spiny sea urchins of considerable size. Other Actinias, even, are not safe in the neighborhood. Such large specimens also have a singular habit of frequently protruding the stomach, and even turning it wrong side out, as if affected with nausea, which certainly adds nothing to their beauty. But specimens of small or medium sizes make very interesting pets, and are often more beautifully colored than the large ones.

In Massachusetts Bay this species is seldom found except by dredging, when it usually comes up adhering to stones and dead shells. It inhabits all depths down to forty fathoms at least. At Eastport, Grand Menan and other islands at the mouth of the Bay of Fundy, where the enormous tides leave exposed, at low water, a wide zone, unusual facilities are afforded for obtaining all sorts of rare and curious productions, which on other parts of the coast can be obtained only by dredging in deep water: On these shores the two large Solasters, or starfishes, with ten or twelve rays and beautiful colors, together with several other rare starfishes, the Daisey Serpent Star (*Ophiopholis bellis, Lyman*), the many armed Basket Fish (*Astrophyton Agassizii, Stimpson*), several large and curious Holothurians, the elegant Alcyonium, the much sought Terebratula, many curious and beautiful Ascidians, among which the Cynthia (*Cynthia pyriformis, Rathke*) or "Sea Peach" is one of the finest and a great variety of rare shells, may all be obtained at low water mark, during the extreme tides, together with a great abundance of the three Actinias above named.

The Red, like the Star Sea Anemone, loves best the fissures and crevices of the rocks and ledges, that are thickly overgrown with fuci and other sea weeds, which furnish a complete protection to the animals nesting among the rocks. Even among the lofty wharves of Eastport there are ledges in the crevices of which hundreds of these Anemones used to be found.

The White Armed Sea Anemone, (*Sagartia leucolena, Verr.*), unlike the three preceding species, is practically unknown except along the southern coasts of New England, upon the shores of Long Island Sound and near New York City. This Actinia is more nearly related to the Fringed-anemone than to the others, and like that has slender tentacles and loop-holes along the sides of the body, out of which threads of stringing darts issue, which are lacking in the two last species. But this is a smaller, and more delicate kind, seldom growing more than three inches high and one in diameter, and the tentacles are much longer and not so numerous. The body is the same texture from base to

summit, and the edge of the disk is not thrown into undulations or "frilled." Its colors are usually light yellowish and translucent, while the tentacles are usually white. It lives most commonly attached to the under side of boulders that have a cavity beneath them, and is well adapted to the aquarium, where it very soon becomes perfectly at home and expands almost constantly. Inhabiting the same region with this there is another more rare species, *Sagartia modesta, Verrill*, which is duller in color and less graceful in form, which lives buried up to its tentacles in gravel.

Besides the species already described, there are several others that are less conspicuous, which inhabit the New England coast, several of which live buried in sand or mud, like many worms and only protrude their tentacles at the surface. These kinds are usually long and slender and taper at the base instead of having a long and flat adhesive disk. Further southward on the Carolina coast, there are several other peculiar species, some of them beautifully colored and also several species of true corals, the animals of which closely resemble the Sea-anemones in structure and habits. One pretty species of coral (*Astrangia Dana, Agassiz* is even found on the southern coast of New England. This is found just below low water mark, encrusting stones and shells, and forming little irregular masses of coral, covered with star-like cells or cups, which are about an eighth of an inch across. The Polyps which in life rise above these stellate cups, are colorless and almost transparent, resembling in nearly all respects miniature Actinias. The coral lives well in confinement, and feeds readily upon bits of oyster in the same manner as the Sea-Anemone.

Some Notes from the Otways, Victoria, Australia.

BY H. E. HILL.

Owing to a variety of causes, our usual Xmas camp to the Otway Forest fell through this year, and the members were scattered in various directions.

In company with Mr. J. F. Mulder, I left Geelong on January 22d for his orchard at Bambra, about five miles beyond Deans Marsh on the Lorne road. We observed nothing of especial interest on the way—only the usual plains birds being visible; on the swamp at Modewarre, where we stopped for lunch, there were good numbers of spurwing plover and sandpipers.

White cuckatoos were plentiful as we entered the ranges, and it seemed that the cry differed from some of them; Mr. Mulder put this down to the presence of two species—the corella as well as the sulphur-crested being present; however, we did not get an opportunity of verifying this. The fires had cleared out most of the country near the road, so that there was not a great abundance of birds, most of them having been driven back or destroyed, although there were a good number of fern birds (*Sericornis*) to be seen. Red Lories (*Platycercus pennautii*) were rather common, and they were in magnificent plumage; the bird always seems to be clothed in richer colors on the ranges than on the plains. While taking a spell in a shady nook in the garden we saw a satin-bird (female) with some grasshoppers in its beak, but we could find no trace of a nest. The grasshoppers were just as plentiful in the ranges as elsewhere; I found afterwards that they had penetrated right through to the coast, there being abundance of them even down to the water's edge, where they found that sea-bathing did not agree with them.

Though at the end of January, there were still a few messmate trees in

blossom. On one occasion a white goshawk (*Astur nov. holl*) flew past. Among the other birds we noticed at Bambra were black cockatoos, wattle-birds, hill crowshrikes white-shafted fantail, black-throated honey-eater, and little brown acanthiza.

On January 25th Mr. Mulder returned to Geelong, while I pushed on to Lorne. It was a rather dreary walk, most of the scrub having been destroyed, with only an occasional unburnt patch here and there. Soon after I left Bambra a brown flycatcher (*Micraca fascinano*) flitted across the road in front of me. The gang gang cockatoo (*Callocephalon galeatum*) was also to be seen in places, uttering a peculiar, harsh, croaking cry as it flew. Bristle birds were abundant down the gullies. Besides the above, I only saw the harmonious thrush, the yellow robin, the white-eyebrowed wood swallow, and the bronze-wing pigeon. Reaching Lorne at about half past ten, I fixed my camp on the St. George, where it took an hour or two to repair the damages my clothes had sustained on the trip.

I did not exert myself much looking for specimens during my stay on the coast, partly because the intense heat took away all desire for exertion, and partly because, being by myself, it was hard to summon up enthusiasm for long walks. Most of my time was spent at little nooks on the creeks watching the birds. On the St. George I noted only the wax-bill, chough, welcome swallow, little black cormotant, white-breasted cormorant, spotted pardalote, blue crane, fairy martin and bristle bird. The last named bird used to be very abundant here a few years ago, but this year there was only one to be heard at intervals. I do not think I heard a dozen individual birds after I reached the coast. I had expected that the fires, having burnt so large a part of the forest towards the Otway itself, would have made the birds, especially these lovers of the the scrub, very abundant indeed in the unburnt parts; as they seemed much scarcer than usual, the only conclusion I could draw was that instead of being driven out from the burnt parts they must have been destroyed.

The choughs always evince a decided preference for the hill tops, in the forest at all events, being almost confined in this neighborhood to the hill on the Erskine, immediately above the township. Perhaps this is due to the proximity of a large orchard which grows on the slope of the hill. The cry of the chough resembles that of he red lory, and of the rosella to some extent. It is known locally as the "jay." The white-shafted fantails were not nearly so abundant as in previous years, and the blue wrens, though in great numbers, also seemed scarcer. The waxbills, however, were as t ck as always. On a Scotch thist near the creek I saw a great number of small beetles of a vivid glossy blue, which moved in short, quick flights, like those of a grasshopper. These have been kindly indentified for me by Rev. Thos Blackburn as *Haltica pagana*, Blackb.

The evenings being rather lonely on the St. George with no companion, I shifted my tent to the Erskine after a couple of days so as to have some one to talk to in the evenings. The camping ground here is very good though rather public; it is well sheltered and level, with abundance of good water at a little distance. An occasional azure kingfisher was to be seen on the creek with a few mudlarks (*Grallina picata*) here and there. There were also several mountain thrushes which frequented the water's edge, just below the wall of blackberries; they were very quiet and tame. So indeed were a number of the birds, in particular the fern-birds, (*Scricornis*), which were very abundant. These used to hop about within a yard or two while I was having my meals, as quiet and tame as the blue wrens. The jackasses were as plentiful as usual, their friendly greeting being often heard.

The boobook owl I only heard once.

A few little mobs of musk parrakeets (*Trichoglosus concinnus*) appeared once or twice, and once I thought I saw some grass parrakeets, but I could not be sure. The Erskine spreads near its mouth into a long lagoon which ought to be a great resort for water birds, but I suppose there are too many people about. The only birds I saw there were one blue crane and one little black cormorant. I was told that black swan and duck were to be seen there now and then, and a bird which, from the description, must have been the bald coot (*Porphyrio melanotus*). On the beach near the mouth I saw the remains of a small petrel, and I saw what I think was the same bird swimming near the jetty on one occasion; it was very quiet, swimming past the lines of the anglers and taking a quiet peck at each line as it passed; which of the petrels it was I do not know, but it was about the size of a dab chick.

While I was sitting near the tent one evening a mob of young gang gang cockatoos settled in a tree near by. A young male which I shot had its stomach and crop crammed with white wood grubs. I was told that thousands of these birds were to be seen in the ranges.

While on the road back to Dean's Marsh I observed two men in a shed at the roadside, who were busily occupied *threshing with flails*.

It has seemed to me that it would be a grand idea to introduce the lyre bird to the Otway Forest. If a few were released in the dense scrub on some of the creeks, such as the Elliott, they would find abundant shelter and food, and a home very similar to their haunts in Gippeland, and the country at the back being but thinly settled, the birds would be pretty free from molestation.

THE MUSEUM.

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Walter F. Webb, Editor and Manager

Albion, N. Y.

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ping down with great scratching into the grass below, where our excited dog took a hand in the matter, daylight often finding our tent strewn with the birds he had captured during the night. When he found time to sleep I do not know. He was after birds the entire twenty-four hours.

"In climbing over the hills of the island we discovered the retreats of these night birds, the soil everywhere through the deep wood being fairly honeycombed with their nesting burrows. The larger tunnels of the rhinoceros auks were as a rule on the slopes of the hill, while the little burrows of the Cassin's auklet were on top in the flat places. We noticed many of their queer abodes that ran back with many turns to a distance of ten feet or more. One or both birds were invarlably found at the end, covering their single egg, for this species, like many other sea birds, divide the duties of incubation, both sexes doing an equal share. relieving each other at night.

"The puffins nested in burrows also, but lower down—often just above the surf. One must be very careful, indeed, how he thrusts his hand into their dark dens, for should the old birds chance to be at home, its vice-like bill can inflict a very painful wound.

"The rookeries of the murres and the cormorants were on the sides of steep cliffs overhanging the sea. Looking down from above hundreds of eggs could be seen, gathered along the narrow shelves and chinks in the rock, but accessible only by means of a rope from the top."

Umbrella Ants

The beauties of tropical scenery, and the wonders of life in the forests of those regions, are well-worn subjects, and have employed the pens of writers of many classes, from the dry-as-dust naturalist, whose only interest is in dissecting every animal, bird or insect he can come across, to such word-painters as Charles Kingsley, who, fortunately for the world at large, did "at last" reach the fringe and outskirt of his long-dreamed-of El Dorado, which he depicted with a delight and enthusiasm which fairly carry away his readers. But they are inexhautsible beauties, and infinite in variety.

To take insect life alone; no life is long enough for the study of it, and no description can give an idea of the multitude of creatures that make their homes on every tree and shrub, and under every slowly dying leaf that falls in the evergreen forest. The air is full of butterflies, moths and flies; while on the ground and under the ground go ants and beetles and spiders and frogs and toads and creeping things innumerable—a vast army that no man may number.

Alas! that I have no pretension to the science of the naturalist, and can only tell, in plain language, something of what I have seen during a six years' residence in Central America; three of which were spent in its densest forests, where the sight of a white man was a thing to be noted.

Of all insects the most interesting are the ants; and it is to be hoped that some one duly qualified for the task will, some of these days, undertake to write the life-history of the most important of their tribes; for, by their intelligence and perfect organization, they take rank above all their kind, and are well worthy of the closest and most careful observation.

The umbrella or "wee-wee" ants are in some ways the most remarkable of all the race; and as I happen to have an intimate acquaintance with their interior economy, it will be well, perhaps, to begin with an account of their manners and customs; how they build their nests, store and keep their food and organize their vast armies.

The name of "wee-wee" is a mystery, but so the negroes call them; though why, they do not know themselves. The Spaniards simply call

them by the generic name of "hormigas," or ants. Along the forest paths the great mounds of earth they throw up are conspicuohs enough, and from them radiate well beaten roads, four or five inches in width, and running in all directions. There they do no harm; but when they make their nests near a garden or plantation, it becomes a question which is to survive, the ants or the garden, for one or the other must be destroyed. Their food almost entirely consists of leaves of trees and other plants, and so numerous are they in a well-established colony, and such indefatigable workers, that they will strip a good-sized tree, such as an orange, in a single night, carrying off the spoil, cut into pieces about the size of one's thumbnail, into their nests, there to be stored for future use in a manner I will describe when we come to the structure of their houses.

It was my misfortune on two occasions to find strong colonies of these ants within measurable distance of where I had to make my garden; so there was nothing for it but to dig them out bodily, or give up the hope of vegetables. The process of digging was a laborious one, as in one instance over two hundred and fifty cubic yards of earth had to be moved; but it certainly gave me a close acquaintance with their ways and habits.

They are divided into four classes—queens, drivers, workers and builders. The queens are nearly as large as hornets, with well-developed wings; though why, it is hard to understand, since they are always found in the interior of the nest, and devote their time and attention solely to the propagation of the race. The drivers or officers are nearly half an inch in length, and are armed with formidable nippers in their jaws, with which they can inflict a sharp bite; quite sharp enough to cut through the skin of one's finger. They are absolutely fearless, and will attack any enemy, however large, without hesitation. They do not work themselves, but run up and down the roads, when the workers are out, keeping them in order, and seeing that all goes well with the procession. The workers, about one-half the size of the drivers, cut the leaf, and carry it in their mandibles, held perpendicularly over their heads, to the nests—whence the name of "umbrella ants."

The builders, as I have called them, because it is difficult to conceive what else they do, are the size of the common red garden ant of this country. They always accompany the workers on their expeditions, and, I believe, carry into the nests minute particles of clay, with which they line all the galleries and passages, as well as the actual nests themselves, until they look as though they were cemented and smoothed by the careful hand of an expert mason. The ants do not always select a tree near their abode on which to work, but will often march to and fro, quite a quarter of a mile or more, to one that suits their taste. Once they have made up their minds to strip a certain tree, nothing but death will stop them. Often and often I have watched the negroes and Indians trying to drive them away from, say, a favorite orange-tree, with flaming torches of dry palm-leaves. Running these over the ants' road, close to the ground, millions of them are burnt to death, whilst the survivers shelter in the grass, or hurry back pell-mell to the nest. This process the niggers call "swingeing," but it is no good whatever, for if you go out in an hour or so, you will find the undaunted ants hard at work on the very tree they were turned back from.

Some faint idea can be formed of their numbers when it is remembered that the whole of this road to the tree, perhaps nearly half a mile long, is densely thronged with the multitudes going out empty, and returning laden with their umbrella-like burdens; whilst thousands and thousands will be swarming in the doomed tree. They have a strong objection to rain, and

when they are caught out at work by a sudden shower, they incontinently drop their loads, and scuttle off home. When this happens—which is not often, for they are wonderfully weather-wise—the whole road will be found strewn thickly with bits of leaf.

It is a very easy matter to prove that the vast army is under proper discipline, for the drivers are constantly running up and down the line, giving their orders, which they communicate in some mysterious manner by touching heads for an instant with the ant who is to receive the order. If you carefully watch the individual so touched, you will see that he stops, or turns back, or hurries on faster, as the case may be—generally the latter.

But the clearest proof of their discipline is to place some obstacle they cannot easily pass, such as a log of wood or a big stone, accoss the line of march. There is at once a jam of ants on both sides, and they run about in utter dismay and confusion. Instantly the drivers come tearing along from either side in a state of frantic excitement. Arrived at the impediment, they run over it, round it, and under it, if they can; and having found out the best way out of the difficulty, speedily lead off the host in proper order. Remember, that until the drivers have duly investigated the cause of the block, not an ant tries to pass the obstacle.

When the colony is established on a level piece of ground, a central perpendicular shaft is made, some eight inches in diameter and six or seven feet deep. This is for ventilating and draining purposes only, and is never used for ingress or egress. If the ground slopes, the shaft is horizontal; the mouth of course being at the bottom of the hill. From the perpendicular shaft, commencing at the bottom, radiate galleries, like the spokes of a wheel, set at a slight angle; these will be about thirty inches long, and about eighteen inches one above another. At the end of each series of spokes a circular gallery is made, forming, as it were, a set of wheels, one above the other. In, or rather above, these circular galleries, the nests, or dwelling places, are constructed; oval in shape, and about a foot long. The narrow end of the oval is downwards, and opens into the roof of the gallery; and, as the spokes always slope slightly towards the shaft, however heavy the tropical rains may be no water can enter the homes and breeding-places of the ants. Once I tried the experiment of diverting a rivulet of water into the upper part of one of the nests, hoping to drown out the enemy, and to economize labor; but it had not the slightest effect on them, for it never penetrated into a single nest.

When all the ground comprised within the first series of wheels is filled with nests, more radiating spokes are run out from the circular galleries, and more circular galleries made at the end of these; and so on indefinitely, until a space of perhaps a hundred square yards or more is occupied.

When all the ants are at home, each dwelling will contain many thousands of them: queens, drivers, workers and builders living together, apparently in harmony.

In each nest will be found a quantity of greyish, half-dried pulp, with occasionaily a few pieces of green leaf mixed in it. The pulp is presumed to be the leaves, reduced to this state by mastication, for no other trace of them can be discovered. Within the pulp, which is honeycombed with holes, are found the eggs and newly hatched young: these latter in their early stages being quite white and soft.

Though the wee-wees live chiefly on leaves, they do not altogether eschew "flesh food," as the vegetaraians call it; for I once found a small tree-frog in one of their nests, with most of one hind leg eaten away. They have also a great liking for maize, when it is ready shelled for them, and will carry off the corn with great ease, holding them over their heads in the same

fashion as they do the leaves. What they do with it when they have got it home I am not prepared to say; but most probably they eat it at once, as no trace of it was found in their nests, though they managed to rob me of a considerable quantity. I well remember my surprise the first time I became aware of this taste of theirs. Sitting one night in my hut, I happened to glance at the corn-barrel, and beheld streams of corn, as it were, slowly running down the outside. Inspection showed that the wee-wees had smelt out my store, and were swarming in the barrel. They were quickly singed out with burning pieces of paper; but the barrel thenceforward had to be secured by some sacking tied tightly over the top, until the nest was destroyed. Night after night they would return to the barrel, but finding there was no getting at the corn, speedily departed.

The bull-frogs are great devourers of these or any other ants large enough to be worthy of their notice. When we were digging out the first nest at the beginning of the wet season, when the frogs emerged from the damp mud in which they spend the time of drought, they would sit round the excavation at dusk, in considerable numbers, picking up with wonderful quickness the drivers, as they ran about in angry wonder at the destruction of their homes. Quick as they were, the big ants would, every now and then, give the frogs a sharp nip on the passage down their throats, and it was most comical to see the fat, unwieldy things jump all-fours off the ground, and kick out their hind legs in a very ecstasy of pain. It behooved us who dug to guard ourselves as best we could against the bites of the enemy. Of course, one tied one's socks over one's trousers, and paused every now and then to brush off the intrepid foes, who gallantly swarmed up one's nether garments to the assault. Occasionally an ant would get within the fortifications, despite of every precaution, and, doubling up himself, drive his nippers deep into a tender spot, with the result that the victim jumped almost as vigorously as the bull-frog. The result of my digging was the same in both cases: when about three-parts of the nest was dug out, the ants that remained alive suddenly decamped one night, and were seen no more. I suppose they had come to the conclusion that it was no good to fight against the fates. Anyhow, I was left to cultivate my garden in peace.

E. W. Williams.

Notes on the Ground Squirrels of Wyoming and How They are Destroyed.

By F. J. Niswander Laramie.

(Extracts from Wyoming State Report.)

"Our most common species is *Spermophilus franklinii*, Sabine, or the gray prairie squirrel." The following description will enable one to identify the species: "Length about ten inches from the nose to root of the tail; the tail about five inches long. It is a little over three-fourths the size of the migratory or common gray or black squirrel, though its short hair, tail and legs make it appear smaller; and its form is much thicker and clumsier than that of the true squirrels. The back is light brown, dotted thickly with black; the under surface is grayish white. The tail is bushy, but much less so, as well as much shorter, than that of the migratory species. The color and markings often vary. The color above is often light yellowish brown, varied with black. The top and sides of the head and the sides of the neck, pure hoary gray. It resembles in its proportions the prairie dog, *Sciurus ludovicianus* — Custis— the only difference being in the size and colorings. The hairs around the margin of the tail are grayish white, each hair having three bars of black. This species, *Spermophilus franklinii*, is recorded as being found in Wisconsin,

Illinois, Missouri, Iowa, Minnesota and Kansas. It is not so abundant in these states as in Wyoming, neither is the damage done by it in these states so extensive as in Wyoming. The Laramie Plains are overrun with these squirrels; being met with on every hand. It seems as though this section is especially adapted to their conditions, although they are more or less numerous through the entire state. They are fond of diggings burrows and sit at the mouth of these burrows on warm pleasant days, barking at the passerby. Away from the traveled roads they are not shy, but near well traveled roads they seek their burrows upon the least alarm. They are quite diffiult to secure when shot, as their death struggles are always directed toward pushing themselves further into their burrows. They are usually gregarious, living in colonies or small villages, the openings of their burrows being on the top of a gravelly knoll, they burrow within a few feet of each other. Several pairs often entering the same hole.

In this portion of the state they usually make their appearance as soon as the frost is out of the ground. I have seen them at the mouth of their burrows while the ground was yet frozen. The average time of appearing is about the middle of March. From this time until the middle of August, or until the first of September, they wage destruction against growing crops. They do most of their damage during the hottest portions of the day. They usually go into winter quarters about September 1st, although but few specimens were seen in 1892 after August 20. During the summer the grain and seeds are stored for winter use. (The word *Spermophile*, meaning seed lover.) The mouth of the burrow is plugged with earth in order to keep out the winter frost.

The methods of destroying these pests are numerous. Many drown them out of their burrows and then kill them. This is a long and tedious method. I have seen water running from an irrigating ditch into one of the burrows for half a day, and it seemed as though another half-day would have been insufficient to have filled the burrow. Then again, in this region, water is often diffiult to obtain. It would in many instances have to be drawn in barrels or tanks for perhaps a half-mile, or further.

Many ranchmen and gardeners use strychnine, rough on rats, arsenic and other poisonous substances. Usually corn or some kind of grain is soaked in a solution of one of these poisons and is then placed near their burrows. This method has in some instances been satisfactory. There is danger arising from the practice of such a method: Stock, poultry and the wild birds are as liable to get the grain as are the squirrels.

During the summer of 1892, a number of experiments, having in view the destruction of these squirrels, was carried on upon the Laramie Experiment Farm. For this purpose a quantity of *bi-sulphide of carbon* was used. This liquid is *highly inflammable and should NEVER be brought near a fire, for fear of an explosion.* It is not poisonous or corrosive to the skin, and may be handled with impunity. Avoid breathing it; the vapor is unwholesome. The only danger is when brought in the presence of fire—a lighted pipe, cigar or match would in all probability cause an explosion. Bi-sulphide of carbon should be kept from children and irresponsible persons, as they are liable to drink it, and the consequences might be serious. The unpleasant odor is easily and readily detected and by observing the proper precaution, no danger need be feared. The method of applying is to take a ball of cotton, about the size of an egg, and thoroughly saturate it with the bi-sulphide of carbon. With a rolling motion throw the cotton into the burrow and close the opening with some earth. The operation is simple and the result certain. The

bi-sulphide of carbon evaporates rapidly, and being heavier than air, soon fills the burrow and smothers or overcomes the squirrels.

The application should be made in the evening, at sun-down, as the squirrels are in their burrows at this time and the material will not be *wasted*. A pint of this liquid will be sufficient to treat twenty burrows.

On the Laramine Experiment Farm ninety-six burrows were treated during the month of July. The applications were, with few exceptions, made in the evening. The next day the treated burrows were visited and in no instance had the earth which had been used for plugging the opening been disturbed. A second and third visit to these burrows found them securely plugged. In two instances some animal, presumably a ground squirrel, had made an effort to dig open the burrow from the outside. The opening extended only to the ball of cotton, when, from all appearances, the task was given up. In forty-three instances "gophers" (squirrels) were driven or seen going into the burrows. These were treated at once, and fortunately none were opened. It is safe to conclude that none of them returned to the surface.

It may be that others would not have the success that attended these experiments, although it is no more than fair to presume that with the exercise of carefulness and thoroughness everyone ought to be attended with the some success.

Jumping Beans.

The socalled "Jumping Beans" which many of the Museum readers have doubtless seen, come from New Mexico and grow on the plant *Sabastiania palmeri*. It is a loose growing shrub, from five to eight feet high, and the wood is very hard. It excludes a great deal of milky juice, which is utilized by the Indians as poison for their arrows. The juice is also frequently found crystalized into a clear white, brittle substance. In the appearance of the wood it reminds one somewhat of the witch hazel, and in the leaf, of a broad leaved willow. As in the case with other plants of the same family, the seeds split open when ripe, if they are not infested by insects. When the seed capsules are quite small, eggs are laid on many by a species of *Grapholitha*. The young larva hatches, and penetrates the seed, very much as in the case of the common Pea Weavel. As the seed develops, the larva also grows, and spins a carpet of silk over the inside of the bean which prevents it from separating as in the natural state. The full grown larva, by its holding fast to the silken lining by its anal and two hind pair of abdominal pro-legs, which have strong hooks, then draws back the head and fore body, the thoracic parts swelling and the thoracic legs being withdrawn. The contracted parts being then suddenly released, the larva vigorously taps the wall of its cell with head, sometimes thrown from side to side, but more often brought directly down as in the motion of a Woodpecker when tapping for insects, thus causing the peculiar jumping motions of the beans. The seed will thus move whenever warmed, for several months.

The *Living Age* has bought the right to use serially Neil Munro's striking story, "John Splendid," which is now running in *Blackwood's Magazine*. It is begun in the *Living Age* for May 28, and will be published in weekly instalments until it is completed. It is Scotch—but not too Scotch; and as W. L. Alden has well said it marks a wide departure from the "kailyard school" of fiction.

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Cold and chill the sunshine falls,
The heavy wind stirs not a stalk,
Eyes do not turn, no voice is heard,
No hand is lifted, nothing moves,
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VOL. IV. NO. 9.

JULY, 1898.

THE MUSEUM

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Two New Books.

The following two books, both just out since the last number of the MUSEUM, we consider the best of their kind ever written. We have carefully examined both, and unhesitatingly recommend them to our readers.

THE ART of TAXIDERMY, By John Rowley, Chief of the Department of Taxidermy in the American Museum of Natural History, New York.

This work is 12 mo, 245 pages, illustrated with twenty full page half tone plates, and 59 illustrative drawings. It is finely printed and beautifully and substantially bound in cloth.

We cannot do better than quote from the preface, in part: "It is a fact much to be regretted, that many taxidermists by reason of their extreme jealously and narrowness of mind, are exceedingly loath to communicate new ideas and discoveries to their fellow workers. But, thanks to the more general enlargement and increase in number of scientific museums of late years, a number of men of genius and education have taken up the study of the art. It is largely owing to their exertions that the Taxidermy of the present day is so far in advance of what it was a decade since; and the few works on the subject that have been written have been eagerly devoured by every progressive taxidermist in the country."

What Mr. Rowley says in above paragraph every taxidermist knows by experience. We constantly meet with skillful men in the Taxidermic art, that are unwilling to divulge a single one of their many little secrets gained from long years of experience. Were it not for such men as Mr. Rowley, every youth with taxidermy aspirations would have to work out every branch of the trade himself.

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THE MUSEUM.

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All notices that come under above will be inserted in this department until further notice at one (1) cent a word. No notice less than 25c. Terms Cash with order. *No charge for address.* I shall at all times endeavor to keep parties, whose reputation is of a doubtful character from using these columns.

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THE MUSEUM.

A Monthly Magazine Devoted to Research in Natural Science.

VOL. IV. ALBION, N. Y., JULY 15, 1898. No. 9

Notes on the Snowy Owl in Captivity.

As I reside in a part of Manitoba in which during the winter months *Nyctea nyctea* is often very abundant I think a few notes on this species will not come amiss to the readers of the MUSEUM; so sit down to make a few notes on a pair I possessed during the past winter.

The beautiful Snowy Owl is quite an abundant bird with us some winters and as far as my observations go I can give no cause for the peculiarities of these migrations.

The winter of 1889, the first I spent here, they were very abundant coming to us as early as October about the 5th of the month during a cold snap when the mercury reached 12 degrees below zero, and staying till May, all through the winter, which was not very severe. I observed them everywhere I went and noticed a great many white or almost white ones among them.

Again in 1893 they appeared early, about the middle of October, and in large numbers, being equally plentiful all through the winter, the last one I saw being on a fence post on the 10th of May, and again this winter they visited us in very large numbers, being plentiful all winter. I noticed the first arrival on the 24th of October and although the winter has been mild and but little snow they remained with us until the latter end of April. About 60 birds of this species have passed through my hands this winter, in all, of which not one was pure white, there being a few black spots on the crown of the head and a few marks on the wing pin feathers of the whitest.

However, to return to my subject. In November I bought a pair from a boy who trapped them and kept them in a pen to observe their habits, but as they were so plentiful I advertised them and disposed of them to a Mr. Clark of Huntsville, Ohio, and a few days after I secured another pair. These were also trapped and soon got over their swollen legs and became lively enough for Owls. I got another pair about two weeks later and as I was very busy I put them all in the same cage which unfortunately was none too large for the comfort of its occupants.

However they got along very well till near the middle of April when they became restless and during early morning and evening hours made most persevering efforts to escape but without success. About this time I built a large house for them 14x10 ft. where I put them hoping my labors might be rewarded by a set of pretty white eggs, but I noticed one of them, the largest and darkest, was mopish and did not take food and after a couple of days it shuffled off its mortal coil without further notice. A post mortem examination developed the fact that it was a female with some well developed eggs in its ovary. What was the cause of its decease I could not ascertain, but I was afraid it got hurt by the other birds in their efforts to escape in answer to the instinct that tells them to repair to the northern latitudes at the approach of warm weather. This left me with but three of my pets on hand and I soon discovered what I had feared, that they were all males. I kept them till June when my absence leaving them in danger of starvation I gave them their liberty and they went on to the north to spend the hot summer months in their cool Arctic home.

From the observations I have made I am of the opinion that the white or nearly white birds are the older males, the spotted small birds the younger males and the large dark ones the females. In size they vary considerably specimens which I have measured being from 21 to 25½ inches in length and extent 58 to 65 inches. They hunt by day and by night always, except on stormy days, perching on the highest place they can find, a fence post, top of a straw stack, top limb of a tree or other elevated station upon which they can command the surrounding country and sit there for hours together watching for their prey. At night when the moon was shining brightly I have observed them stationed on a stable or barn roof or the chimney or stove pipe on top of a house, their white plumage glistening in the moonlight.

They are not very large eaters and I was surprised to find how little it took to keep these birds alive and like other birds of prey a good feed will last them quite a while. They live for the most part on rabbits and mice which in the winter are quite plentiful. My pets got so high-toned from being fed on dressed meat that on one occasion when I was away over night I threw in a rabbit and on my return found they had not touched it, it having lain in their cage 36 hours without the skin being torn. I fed mine on the bodies of birds and animals I had skinned and they seemed to like to be saved the trouble of taking their own prey. I gave them a snake once but they did not eat it and seemed to prefer animals to birds. A fresh ground squirrel or gopher quite warm would be devoured before anything else.

They were very quiet during the winter, the only call I heard them make then resembled "qua" and they had a sharp shrill squeak or rather whistle when hurt which they emitted when in their fruitless efforts to escape about migratory season they would scramble over each other and hurt each other with their sharp claws. In April I used to hear them call to each other with a call like "*hoo-hoo*" with an inflection like the plaintive cry of the Mourning Dove.

But the object for which I kept my pets failed and I am still without the eggs of this species. However another season I hope to be more successful and by keeping a female secure a set of these eggs.

CHRIS. P. FORGE,
Carman, Manitoba.

June 24, 1898.

Mollusca of Monroe Co., N. Y.

BY JOHN WALTON.

The following list while covering only Monroe Conty, is a handy list for all Western New York collectors and others residing near that territory.

Pleurocera subulare, Lea. Lake Erie.
Goniobasis virginica, Say. Erie Canal.
" var. multilineata, Say. Erie Canal.
Goniobasis livescens, Mke. Erie Canal.
" depygis, Say. Irondequoit Bay.
Goniobasis semicarinata, Say. Irondequoit Bay.
Bythinia tentaculata, Lin. Erie Canal.
Gillia atilis, Lea. Erie Canal.
Amnicola limosa, Say. Genesee River.
" porata, Say. Erie Canal.
" Orbiculata, Lea.
" pallida, Hald.
" granum, Say.
Pomatiopsis lustrica, Say.
Valvata tricarinata, Say. Charlotte.
Valvata sincera, Say. Erie Canal.
Melantho ponderosa, Say. Erie Canal.
" decisa, Say. Erie Canal.
" " var, obesa, Lewis, Erie Canal.
Melantho decisa, var. genicula, Con. Erie Canal.
Melantho decisa, var. integra, Say. Erie Canal.
Melantho decisa, var. heterostropha, Erie Canal.
Melantho rufa, Hald. Erie Canal.
Vitrina limpida, Gld. Pittsford.

Macrocyclis concava, Say. Pittsford.
Zonites fuliginosa, Griff. Rochester.
" intertexta, Bin. Pittsford.
" inornata, Say. Pittsford.
" nitida, Mull.
" arborea, Say. Pittsford.
" indentata, Say.
" multidentata, Bin.
" minuscula, Bin.
" viridula, Mke.
" chersina, Say. Pittsford.
" suppressa, Say. Pittsford.
Mesodon albolabris, Say. Rochester.
" " var. dentata, Pittsford.
Mesodon thyroides, Say. Rochester.
" Sayii. Bin. Pittsford.
Tachea hortensis, Mull. (introduced.)
Triodopsis palliata, Say. Pittsford.
" tridentata, Say. Rochester.
" fallax, Say. Rochester.
Vallonia pulchella, Mull. Pittsford.
Stenotrema hirsuta, Say. Rochester.
" monodon, Rack. Rochester.
Stenotrema, ditto, var. fraterna, Say. Rochester.
Stenotrema ditto, var. Leaii, Ward. Rochester.
Patula alternata, Say. Rochester.
" perspectiva, Say. Pittsford.
" striatella, Anth. Pittsford.
Strobila labyrinthica, Say. Pittsford.
Helicodiscus lineatus, Say. Rochester.
Limax maximus, Linn. (introduced.)
" flavus, Linn. (introduced.)
" agrestis, Linn. (introduced.)
Limax campestris, Binn. E. Rochester.
Tebennophorus caroliniensis, Bosc. Pittsford.
Tebennophorus dorsalis, Binn.
Pupa muscorum, Linn. Brighton.
" Pentodon, Say. Rochester.
" contracta, Say.
" corticaria, Say. Pittsford.
" rupicola, Say.
" fallax, Say. Rochester.
" armifera, Say. Rochester.
" milium, Gld.
" simplex, Gld. Irondequoit.
Vertigo ovata, Say.
Carychium exiguum, Say. Rochester.
Ferussacia subcylindrica, Linn. E. Rochester.
Succinea ovalis, Gld. Charlotte.
" avara, Say. Rochester.
" obliqua, Say. Pittsford.
" Totteniana, Lea.
" aurea, Lea. Rochester.
Limnea stagnalis, Linn. Brighton.
" reflexa, Say. Rochester
" elodes, Say. Erie Canal.
" pallida, Ad. Erie Canal.
" caperata, Say. Pittsford.
" catascopium, Say, Rochester.
" columella, Say. Erie Canal.
" desidiosa
Physa gyrina, Say. Erie Canal.
" ancillaria, Say. Rochester.
" heterostropha, Say. Rochester.
Bulimus hypnorum, Linn. Pittsford.
Planorbis trivolvis, Say. Charlotte.
" companulatus, Say. Pittsford.
" bicarinatus, Say. Rochester.
" deflectus, Say. Brighton.
" parvus, Say. Charlotte.
Segmentina armigera, Say. Brighton.
Ancylus rivularis, Say. Genesee River.
" tardus, Say. Irondequoit.
" parallelus, Hald. Charlotte.
Unio alatus, Say. Erie Canal.
" cariosus, Say. Erie Canal.
" complanatus, Sol. Genesee River.
Unio gracilis, Bar. Erie Canal.
" gibbosus, Bar. Erie Canal.
" iris, Lea. Erie Canal.
" novi eboraci, Lea. Erie Canal.
" nasutus, Say. Erie Canal.
" luteolus, Lam. Genesee River.
" occidens, Lea. Erie Canal.
" plicatus, Less. Erie Canal.
" pressus. Lea. Genesee River.
" radiatus, Lam. Genesee River.
" rectus, Lam. Erie Canal.
" rosaceus, De Kay. Charlotte.
" rubiginosus, Lea. Genesee River.
" undulatus, Bar. Erie Canal.
" Tappanianus, Lea. Genesee River.
Margaritana rugosa, Bar. Genesee River.
Margaritana deltoidea, Lea. Erie Canal.
Margaritana marginata, Say. Erie

Canal.
Anadonta Benedictii, Lea. Erie Canal.
" edentula, Say. Long Pond.
" excurvata, DeKay, Pittsford.
" Ferussaciana, Lea. Erie Canal.
Anadonta ferruginea, Lea. Genesee River.
Anadonta fluviatilis, Dill. Allens Creek.
" fragilis, Lam. Pittsford.
" imbecillis, Say. Irondequoit Bay.
Anadonta implicata, Say. Charlotte.
" Lewisii, Lea. Erie Canal.
" salmonia, Lea. Erie Canal.
" undulata, Say.
" subcylindracea, Lea. Irondequoit Bay.
Sphaerium similis, Say. Erie Canal.
" partumeium, Say. Genesee River.
Pisidium variabile, Prime. Brighton.

Extract from proceedings of Rochester Academy of Science.

Two Rarities.

Having seen little in the MUSEUM from Southern California so far this season, it may not be uninteresting for me to note the taking of two quite rare sets.

On the 17th of April while looking for Cactus Wren's nests, I was surprised to see a small owl leave a large nest placed about four feet up in a clump of Cacti, and, after flying 25 or 30 yards, settle down on a White Sage bush. Soon another bird of the same species appeared and my surprise may be imagined when I saw they were California Pigmy Owls (*Glaucidium gnoma californicum.*) They did not appear to care very much about their nest or its contents as they sat quietly while I took the six white eggs which the nest contained. Unfortunately one of these was damaged so badly that it could not be preserved. The remaining five however form the most prized set in my collection. As I had not taken my gun with me I had to be content with observing the birds from a distance. According to this crude method they seemed to be seven or eight inches in length; upper parts dark olive brown with small spots of white most numerous on top of head and largest on wings; white below flecked with dashes of brown, these uniting to form a band across the throat. Tail two or three inches long; dark brown, each feather having several spots of white on upper surface.

The eggs were slightly larger than those of the California Wood Pecker (*Melanerpes formicivorus bairdi*) but lacked the polished appearance of the eggs of all the Picidae. The shell was very thin and required the utmost care in blowing. The entire set was perfectly fresh and the nest evidently one from which its builder, a Cactus Wren (*Campylorhynchus brunneicapillus*), had been driven by the more pugnacious owls.

One other set of which I wish to speak is that of (*Vireo Huttoni*), Hutton's Vireo. The finding of this set as is usually the case with our rarer birds was an accident. I was looking through a strip of low land, grown up with small saplings, in the hope of finding a few sets of the Arkansas Goldfinch (*Spinus psaltria*), Western Wood pewee (*Contopus richardsonii*), and Black-headed Grosbeak, (*Habia melanocephala*), when I saw a pensile nest hung from the fork of a small willow branch about eight feet up. Upon bending down the limb I saw three highly incubated eggs evidently those of some Vireo. A few moments waiting revealed to me a pair of Hutton's Vireos. The olive green of the upper parts shading into greenish white below; the large eyes, and the broad bands of grayish white across the wings identified them so thoroughly that I did not try to shoot them.

During the time in which I was engaged in removing the eggs and nest, the female kept up a constant scolding. Her notes were harsh and in fact the only notes I have ever heard this species utter are short and queru-

lous, something like those of the California Bush-tit (*Psaltriparus minimus californicus.*)

The nest was woven from fine strips of the inner bark of dead willow trees. The walls were three-eighths of an inch thick at the top and five-eighths at the bottom. Although built by one of a family noted for their beautiful nests, I was very much surprised at its compact symetry, and had not the set been badly incubated it would have been a highly desirable addition to any cabinet. As it is the set has a place in my collection even though the holes are "as large as the eggs." The eggs are about the size and shape of typical specimens of the Maryland Yellow-throat (*Geothlypis trichas*), but the markings are very faint and sparsely scattered over the larger end of the egg. At a distance they appear to be unmarked. The ground-color is pink, and the markings tiny dots of brick-red.

The birds are not uncommon in this region but this is the first set I have seen recorded from Orange county, although doubtless many have been taken.

HARRY H. DUNN.
Fullerton, Orange Co.,
California.

Outing for July is a seasonable and altogether satisfying number in text and illustrations. Prominent among a well-chosen assortment of good things are—"Canals for Summer Cruises," by E. W. Foster; "Salmon of the Sou'west," by Frank H. Risteen; "A Day on Georgian Bay," by Ed. W. Sandys; "Sport's Place in the Nation's Well-being," by Price Collier; "Vignettes from the Wheel," by Chas. Turner; "Golf, the St. Andrews Club of America," by John Reid, and Yachting," by A. J. Kenealy. Canoeing, cycling, shooting, camping and fishing all receive proper attention. The editorial and record departments cover all the sports and pastimes of ladies and gentlemen.

Note.

The Scientific *American*, which has always indentified itself very closely with the interests of the Navy, is to be congratulated on the extremely handsome and valuable "Navy Supplement" which it has lately put before the public. We think that, if the average reader had been asked beforehand what kind of a work he would prefer upon the Navy, he would have asked for just such an issue as this.

Both the illustrations and the reading matter are of the straightforward explanatory kind which is necessary to put a technical subject clearly before the lay mind. It was a happy thought to preface the work with a chapter upon the classification of warships and insert a few diagrams by way of explanation of the subtle differences between cruisers, monitors and battleships; for after digesting this chapter one is prepared to follow intelligently the detailed descriptions of the various ships which make up the bulk of the issue. One of the best things about this number is that it does not merely give an external illustration of each ship, but it takes the reader down below decks, and initiates him into the mysteries of the magazines, handling rooms, ammunition hoists and motive machinery. The sectional views of the interior of the turrets of the monitors are exceptionally fine, as is the large wood engraving of the engines of the "Massachusetts." The last page of the number contains complete tables of the new Navy, the auxiliary fleet and the various naval guns. A handsome colored map of Cuba and the West Indies is furnished with this issue. We extend our congratulations to our contemporary on the production of a work which is well conceived and admirably carried out. This work is published by MUNN & Co., of 361 Broadway, New York, for 25 cents.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

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American Ginseng.

For centuries Chinese ginseng (Panax ginseng) has been to China far more than quinine has been to America. Unlike quinine, however, its use has not been limited to certain classes of disorders. It has been used in America only as a demulcent, a mild aromatic and stimulant, for which purposes our materia medica recommends many more effective drugs. Not so in China; the conservatism of the Mongolian and his belief in the occult have maintained an exaggerated estimate of its efficacy. It has been employed by the Chinese as a specific for nearly every ailment that flesh is heir to, from the most trivial to the most serious It is further thought, such is the superstitious belief, to procure and insure immunity from all sorts of diseases and even to possess the power of prolonging life. It is well named panacea.

The esteem, nay veneration, in which it is held and the high price that it commands in the market have naturally led to a thorough search for a substitute, not only in eastern Asia but in other parts of the world. Japan and Korea have furnished roots that so closely resemble true ginseng in form that their detection in samples of the genuine is attended with great difficulty. These roots are simply adulterants, since they lack the officinial qualities of the true root. America, however, produces a plant (P. quinquefolium) that not only resembles the latter in appearance but also in its properties, and that has been an important article of commerce for over a century and a half.

In 1714 Father Jartoux, a missionary in China, published "The Description of a Tartarian Plant called Ginseng" in the Philosophical Transactions of the Royal Society of London. A copy of this letter fell into the hands of Father Lafitau, a missionary among Iroquois Indians. In 1716, after diligent search and inquiry among his flock, he succeeded in finding a plant near Montreal, Canada, that answered well the description given by Frther Jartoux.

Samples of this root were collected by the Indians and exported to China by the French. These shipments were so well received that a considerable trade was built up, much to the profit of the traders In Quebec the root was purchased at 2 francs a pound; in China it was sold as high as 25 francs. Trade with China was at that time controlled by the Company of the Indies, which, believing that the market demand was slight, at first allowed its officers to handle ginseng as a private speculation. In 1751, however, seeing that the commerce in this root was becoming important, the company prohibited private ventures on the part of its officers and assumed control itself. In only a short time the price was advanced from 12 francs to 33 france a pound. But, in 1852, owing to an excessive demand in

France, a large quantity of the root was dug out of season and improperly dried in ovens. When this reached China it was found to be of such poor quality that it was refused. This practically ruined the Canadian trade.

The New England States, and later, the sister states as far west as the borders of the Mississippi, profited by the misfortune of their northern neighbors and gradually built up a trade with the Chinese that in 1858 amounted to 366,053 pounds, valued at $193,736, or about 52 cents a pound. Since then the industry has continued to advance until, in 1896, the exportation reached 199,436 pounds, valued at $770,673, or an average price of $3.86 a pound. It will at once be noticed that the quantity exported in 1896 is only about half as much as was shipped in 1858, but that the average price has increased more than seven times. This increase is due to the market demand and an inadequate supply; the decrease in quantity to improper methods of digging more than anything else. The figures for the exports of 1897 have not yet been made publicly known.

American ginseng is a perennial herb indigenous in almost all of the States east of the Mississippi, in the first tier of States west of that river and in Canada. It is of very slow growth even under the most favorable conditions, reaching a commercial size not sooner than the fourth year. In the forest, its native haunt, it rarely produces seed before that time, and even when older this is borne in comparatively small quantities, seldom being more than fifty seeds to a plant. In a state of nature its only means of propagation is by means of seeds. These ripen in September. If, therefore, the plant be dug prior to the ripening of the seed, it is deprived of its only means of perpetuating itself. Yet this is the very thing that happens. The "sang" diggers, a class of people that eke out a livelihood by hunting this root, trapping and shooting, exercise no judgment as to the season of digging. The plant is dug, as soon as found, whether in April, August or November. It is little or nothing to them that the quality is poorer and that the shrinkage is greater than when dug in season. It is also of small moment that the two Virginias have passed laws to prevent the digging until after the fall of the seed. Their nomadic life insures them against capture and if they are accidentally caught they live at the expense of the State and go back to their old tricks as soon as released. The only other causes of the lessened supply of this root are the clearing of forest lands and the browsing and trampling of stock pastured in the woods.

The visible decrease in the supply of the wild root and the constant increase in the market price have led to many experiments in the cultivation of ginseng. But so frequent has been the failures that its culture has been declared impossible. Such is, however, not the case, since with proper attention to its peculiarities, it may be grown successfully and profitably. It is of prime importance that the conditions of the forest be closely imitated. In fact the best place to locate the plantation is in the woods, although if provided with artificial shade, such as is provided by an open lattice roof, the plots may be located in the garden or the orchard. It is essential that the beds be made in loose soil retentive of moisture and well supplied with humus, that they be kept free from tree roots, well shaded, fenced off to protect them from stock and covered in the winter with a mulch to prevent damage by severe frost. The seed must never be allowed to become dry or it will fail to germinate. The risk is all the greater since the seed must be protected until eighteen months old, as it will not sprout sooner; i. e., seed ripened in the autumn of 1897 will not germinate until the spring of 1899.

The seedlings must be transplanted at least once before being set in the final beds. At all times these beds must be kept clear of weeds by hand. Ginseng will not tolerate the use of tools; horse cultivation is out of the question. Such in brief are the principal points to be observed in the cultivation of the plant. The care necessary in the preparation of the root for market is no less important.

In the autumn of the sixth or seventh year—sometimes as early as the fifth—from the time of sowing the seed, the roots may be dug. This is not earlier than the latter part of September, after the seed has been gathered. Roots that have not attained a desirable size should be replanted, only the largest being marketed.

The operations of washing and drying must be very carefully done, since the mutilation of a root lessens its value in market. In the washing the roots are agitated with a broom in a tub of water. The water is frequently changed to insure cleanlinesss, and the roots, not perfectly clean at the close of the rough washing, are finished by hand brushes. They are then dried on wire netting trays in a current ot warm air, the fibrous portion, or "beard" as it is called, being rubbed off when it becomes brittle. The "beard" is sold to the local drug trade for people who like to chew ginseng. In the drying the roots lose about two-thirds of their weight and become very hard and brittle. They are then ready for shipment.

The cultivation of ginseng is a promising industry. The extension of the cultivated beds is not at present rapid enough to supply the deficiency in the wild root, and an immediate glut is not likely. Should there be a temporary decline in price or should a glut occur, as has sometimes been the case, a grower need lose nothing, since he may leave the roots in the ground for one or more seasons knowing that they are improving in size and quality. Other advantages in this industry are that it may be made incidental to general farming, may be started and continued without excessive outlay of capital, and may be confined to land that otherwise could not be used for cultivated crops. When properly managed, a very small area may be made to yield a very large proportionate return.

One grower, Mr. George Stanton, Summit Station, N. Y., obtained from $4\frac{1}{2}$ square rods, in five years, 320 pounds of green root, which, when dried. would have been about 106 pounds, worth, at the price then ruling for cultivated root, $575. On the other hand, figures such as these must not be used to compute returns from an acre or acres, since the cultivation of ginseng in large areas is likely to prove infeasible from inattention to necessary detail. Ginsing is an exacting crop and will be disappointing if not properly managed.—*Scientific American.*

About Shells.

In the course of my herborizations in Cuba, I have had frequent occasions to climb trees for flowers which I could not otherwise obtain, and much more frequent occasion to clamber about the limestone cliffs which furnish a great variety of plants many of which are common in such localities, and are found nowhere else. In these circumstances, it was hardly possible that my attention should not be drawn to the shells, some inhabiting the trees and many more the rocks. I came, in truth, to be very fond of them, spending many hours entirely devoted to shell hunting which, [illegible]I began to think, I could have spent more profitable in my legitimate calling. I propose to relate some of my observations and to give my views as to some of the causes of some of the phenomena observed, hoping that they who make this branch of the animal kingdom a study, may be prompted to further investigate these phenomena more minutely than I had time or ability to do.

Shells have a season of hibernation in hot climates as well as in cold; but in the former, the cause of their inactivity is dryness; the latter, low temperature. If the draught be protected the greater part seek a retreat where some degree of moisture prevails. For example, in the ground or among the dead leaves covering it; in a hollow tree or in the crevices of the bark; under stones or among the leaves of epiphitic Tillandsias. But occasionally an individual is found abroad at this season, and repeated examination led me to discover a reason for it; whether it is the reason, remains for wiser ones to determine. These shell are commonly stuck fast where they are found, and not merely adhering as in a time of rest in the wet season. And they have all been injured, the shell more or less broken. Are they going to die? Are they undergoing repairs? This last seemed to me more probable. They are always, in part at least, grown together, not quite symmetrically often, but generally quite firmly. Do they eat by night as in the rainy season? This I cannot assert. The firmness of their attachment would indicate that they do not. So uniform has been my experience in this case, that now, if I see an Achatina or a large Helicina on a tree in the dry season, however inviting they may appear at a distance, I pass them by as worthless.

Oleacina and its allies are carnivorous snails. They have a smooth, polished delicate shell, yet possesses the power to capture and devour others many times larger than themselves, besides being protected with a firm shell and a closely fitting hard operculum. Not unfrequentiy we find large shells like *Helicina regina* or *H. sagraana* quietly submitting to be devoured by an Oleacina, which it has the strength to walk off with, as easily as a tortoise could carry away a mouse. Wherein lies their great strength? I can offer a suggestion. I have ofter been in such situations on the face of a vertical cliff, that I needed both hands for support. At such times if a shell attracted my attention, I used to put it between my lips till I reached a place where both hands were free. Thus I learned that the watery or slimy secretions which all these animals emit, in the case of this group, is bitter; and in the larger species, very decidedly so. I can hardly doubt that the secret of the power which these snails possess is to be sought here. May not this bitterness produce a benumbing effect on their prey? I have discovered a like bitterness in no other shell, and I collected many species in this way, using my mouth as a temporary box.

Proserpina has a shell of like structure as that of an Oleacina. Once I found one in close contact with a Melaniella, this, together with its structure, led me to suspect that it, too, is carniverous. Who knows? Will an examination of the tongue tell? Will some one try it? I once amused myself capsizing these little fellows, and if they did not manifest real anger, there was a good imitation of it. Turned on its back, it lashed its tail about violently for a snail; or I might say it behaved mulishly and kicked, the organ thus forcibly used being called the foot, I believe. The inverted position seemed a painful or disagreeable one.

I hesitate to record an observation repeatedly made on account of the apparent improbability of the fact, and the difficulty of explaining it. Individuals of some species of shells, many times vary greatly in size as well as color. In other species the said variations are slight. In one or more species of Cyclostoma of this latter kind, I have often found young individuals considerably larger than fully grown. There could be no shadow of a doubt that these were all the same species, and not two distinct ones living together. Among a dozen or two fully formed shells and others nearly grown, all agreeing well in size, one,

perhaps two or more, incomplete individuals would occur, so much larger than all the rest, as to suggest the question. Why do we not find finished shell of this larger size?

Two solutions of this question have presented themselves as possible, though neither of them is quite satisfactory. One is that the animal has power to absorb its shell and reconstruct it of a smaller size. The other, which seems more probable, is, that these overgrown individuals, are abnormal, deformed and never come to perfection. Thus, being thin and fragile, they soon crumble and disappear. I have thought that I found proof or evidence that mollusks have power to absorb and reform their shell. From Melania and Paludina, which are Viviparous, I used to preserve the young found in process of cleaning the shells. Observing that they were quite blunt at the apex, and that somehow in their growth toward materity, they became sharp pointed, I could in no other way account for this than by supposing that they absorb the shell, and reconstructed it after a smaller pattern. I will admit for what it is worth, the possibility of inaccuracy in my observations when comparing small things with great. Thus a very short cone might appear blunt, while, if increased ten-fold, the bluntness would be, relatively, quite little. Yet this view does not satisfy me, and I still think my first impressions were correct. Will not some one by accurate measurements settle this question.

On the beach to the eastward of Matanzas the habits of a Cyclostoma struck me as note worthy. A hundred yards or more from the shore, the ridge formed of sand and broken shells is overgrown with various trees and bushes, which this shell ascends probably to feed on some lichen. But if the tree leaned at any considerable angle, say twenty-five or thirty degrees, no shell could be found on it. And of the bushes, too, it had its choice as to size also. None seemed to venture up a bush, or there was no attraction for them, if it were not larger than the finger or thumb. It may very well be, that on the small bushes they find nothing to eat; but the same reason cannot be given for their refusal to ascend the larger leaning ones.

It has been said above that in winter shells mostly lie dormant, not on account of the cold, but of the dryness. But if, at this season a heavy shower occurs, which is not very unusual, they come out of their hiding places and appear to be feeding; not, indeed in such numbers as during the summer, for already many are dead. Now let a norther, which is a drying wind, spring up, and they haste away to their retreats with all possible speed. Such a shower occurred on a winter night when I was in the neighborhood of Guane, where there are excellent rocks for shells, and many and various shells among the rocks. Early in the morning I found some specimens of *Melaniella Pichardi*. They were not abundant, though I saved a considerable number, and was desirous of collecting more of them, as it is by no means common. While I was at breakfast a light norther began blowing, I made but a short stay, and returned to the rocks, in hopes, though not confident of finding more. Not one was to be seen however. Similar effects are produced by a norther on other shells. Just at night I have discovered *Cyclostoma salebrosum*, in numbers, on rocks, where, in the morning, if a norther prevailed during the night, not one could be found but by searching among the leaves at the base of the rocks. This shell, with some others, as Cyc. rotundatum, and Cyc. undatum, have a way of letting go and rolling to the bottom of the rock if it be inclined (and they seem to prefer such) when they see a hand approaching; and this, apparently, when they have not even one eye open. It would seem as if they felt the approach of danger.

A group of Cyclostomas, *C. clandicans*, *C. assimile*, *C. tenebrosum*, and perhaps others, spins a thread by which they hang from the lower side of projecting rocks. When the weather clears after a rain, numbers may be found thus at rest, particularly in the early summer, when the young abound. Whether they can haul in their lin · I am unable te say, but guess they cannot; for many are found with the border broken, which could hardly be so common, unless caused by a fall from some height. If in this position they fall, it must some times be a distance of fifty, or it may be hundreds of feet. These are all delicate shells; and the power of suspension seems as if designed for their injury or destruction.

Helix stigmatica, and its allies live under stones or among dead leaves. They are dull in color, and the most of them small in size. *H. stigmatica* is never found fairly in the daylight. Once only, if I rightly remember, I found an individual which had just turned the corner of the rock under which it lived. Why do they not come out to the light, and what do they live upon in the dark retreats. Another group of similar habits comprises *Helix Titanica*, *H. pulcherima* and others. These have longitudinal lines of bristles or rather stiff hairs, which are quite conspicuous in the young shell, but diminish, wear away, or quite disapper with age.

Shells often cease growing for a time, so far at least as relates to their calcarous covering. Their growth is interrupted during the dry season, and it may also be an unusually dry time in summer. In banded shells, where the growth is resumed, the pattern of their markings is often, perhaps always changed. The bands may be moved to the right or left, or be divided into two, or two may be united, or a color may be suppressed, or a new one introduced, or any one color may be widened or narrowed. In *Helix picta* the variety of markings is almost innumerable. Whlie the animal remained quiescent as a whole, why did not the several parts retain their relative positions? The color-secreting glands must have changed in position.

The wide diffusion of some species, and the extremely limited area in which others are found, excite in the inquiring mind a desire to know the causes of this unequal distribution. *Helicina regina*, in several forms is found in the whole of the mountain range of the western part of the island. *Helicina adspersa* is another extensively diffused species besides being very variable in size and markings. On the other hand, *Cyclostoma foveatum* has been found in only one locality, at the base of a high projecting cliff, in considerable numbers, but all dead; nor is it known where it lives. I have looked upwards from below, and have climbed to the top and looked downwards in vain. Not more than two or three have been obtained in a moribund state, a single one only with sufficient life to enable Gundlach to describe and figure the animal. A few square yards contain all we know of this species. *Liguus fasciata* is found from one end of the island to the other, and at all elevations above the sea, under several forms which have been described as distinct species. *Helix picta* is another widely diffused shell, and extremely variable in color and size. I have observed many young in the top branches of a high tree just felled, on the very top of the mountains, in Yateran. It seems to be a high climber, which may account for its comparative rarety, fully grown and alive. I have met with very few.

Cylindrella is largely represented in Cuba, more than eighty species being enumerated in the later catalogues. Most of the species are extremely local, several, so far as known, being restricted to localities of a few yards square, or to a few rods. Doubtless other localities will be discovered for many of them. A few as *C. Poeyena*, *C. elegans*, *C. irrorata*, are much

more widely spread, but probably not one extends through the whole island as does *Lignus fasciata*. But what is more noteworthy is the remarkable tenacity of life possessed by many species. Some have lived for months and even years; and, unless closely confined, they will crawl forth on the return of warm damp spells of weather, getting into the wrong boxes and creating sad confusion.

Clytus Flexuosus and Speciosus.

The *Clytus flexuosus* or locust tree borer, is an insect about three-fourths of an inch in length not including the antennæ, and is of a black color with three transverse lines of a yellowish color across the thorax and one across the head; also has one behind the antennæ above the maxillæ. Elytra also covered with markings of a similar color; the first two similar to a crescent, and the three others wavy. Tarsi and tibia are of a reddish color. The larvæ are of a whitish color and are about the same size as the perfect insect.

The beetle is very destructive to the common locust (*Robinia pseudacacia*), but I have never found any on *R. viscosa*. When the insects attack a tree, little masses of what looks like sawdust may be seen between the forks, at the base, or adhering to the bark. These are fragments of the wood which the larva casts out during its borings. These beetles or their larvæ may be killed, by inserting a wire into the hole they have made in the tree, but a more effective remedy, is said to be an application of strong soap suds to the stems and branches, especially when the attack is first noticed.

They are almost as difficult to capture as the tiger beetle, and also make a loud buzzing noise when flying.

The maple tree borer, *C. speciosus* is a larger and handsomer insect. It is velvety black in color, with bright yellow stripes and markings. It is very rare in this locality and I have thus far, only seen one specimen, and that is in the collection of a friend.

The treatment given for preventing the attack of the locust borer, will prove equally effective in the case of this last species.

These two species differ from other borers in attacking perfectly healthy trees, while the other genera, *orthosoma* and *monohammus* attack only such trees that have met with some injury, whether from wind or fire.

W. J. WINTEMBERG,
Washington, Ontario, Canada.

New Books.

We are in receipt of the fifth edition of Davie's Nests and Eggs of North American Birds. This work has had such an enormous sale in its other four editions, it is needless to say it will be considered indispensible by every working oologist.

The present edition contains over 500pp and is amply illustrated. The descriptions are full and complete and careful attention has been given to geographical distribution which is now more important than ever with the constant change of the A. O. U.

Part II of the work consisting of 18 pages is given up to Ornithological and Oological Collections. Chapter 1 covers eggs; chapter 2, the skinning and making ap of bird skins with 3 fine full page plates showing all stages of the process. We commend the work to every oologist. It is advertised elsewhere in this number.

A new work on Taxidermy has just been issued by John Rowley, chief taxidermist of the American Museum of Natural History, New York. We have examined it carefully and find it decidedly up to date in every particular. No one can doubt the rapid progress of scientific taxidermy. See our advertisement elsewhere.

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Our stock of *small shells*, (nice Cabinet specimens) is ever on the increase. We offer an attractive list this month and solicit your orders. All will be sent prepaid on receipt of price. Remember we only offer and send out live collected specimens that are in first-class order. One half dozen of the more expensive kinds will be sold at dozen rates. For from 1 to 2 cents extra per specie, we will put specimens in glass vials when possible to do so.

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" [illegible]ea	.10
" [illegible]a	.10
" [illegible]olus	.15
" [illegible]ava	.15
" [illegible]erpentina	.15
" [illegible]ans	.15
" [illegible]oleta	.30
" [illegible]evata	.30
" [illegible]ilis	.60
" [illegible]alax	.12
" [illegible]ivinus	.30
" [illegible]gilaris	.15
" [illegible]hirsuta	.15
" [illegible]hortensis	.15
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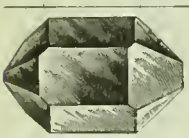

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VOL. IV. NO. 10.

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VOL. IV. ALBION, N. Y., AUGUST 15, 1898. No. 10

Collecting and Preparing Ferns for the Herbarium.

The collecting of ferns for transplanting, and the collection of fronds for preservation as botanical specimens, are to be pursued at very different periods of the year.

To the latter that we are desirous of devoting a few pages. It may be premised that for botanical purposes fronds destitute of fructification are worse than useless unless they belong to species which produce distinct fertile and barren fronds, and in which the characters and appearance of these fronds materially differ. In such cases the two kinds of fronds should be collected and preserved together.

The period for collecting ferns for the herbarium is therefore manifestly that when the fructification has nearly attained to maturity, and it is always better to collect them on a dry day than on a very wet one. The collector should go out prepared for collecting ferns, if he desires that his herbarium should present a neat and respectable appearance when completed. Some recommend a vasculum, some a bag and some a large book under the arm; but commend us to two half-inch deal boards, about 11 inches by 17, with a strap and buckle for each end, and 20 sheets of bibulous paper, cut to the same size, and placed between them. Having selected a good frond or two for preservation, taking care not to break the stipe or stalk, but to separate it from the rhizome or ryot stock, bend back the stipe just below the lowest leaflets of the frond, breaking the woody portion, but not dividing it from the rest of the frond, and lay it carefully between a sheet of your bibulous paper, and secure it with the spare paper between your boards; then proceed in search of more. Fronds, which with their stalks are not too long for the paper, should be laid in without bending.

In selecting fronds for preservation, it is not the largest that are required, but is rather advisable to collect such specimens as will lie comfortably between the papers without bending, than to aim at procuring *fine* specimens which may only prove to be a nuisance. A perfect frond of nine inches in length is better than a folded or otherwise mutilated one of nineteen inches. In selecting fronds the fruit should not be too ripe, or instead of spores you will only find empty cases not to mention the rusty dust that will continually fill your papers. It is better that the spores should be scarcely matured. Then again it should be noticed whether the frond is eaten by insects, broken, or in ony other way imperfect. Such specimens are to be avoided if others can be obtained. Finally, the specimen selected should be well grown, and not distorted, unsymmetrical, or exhibit a tendency to sporing or departure from the general tyye of the neighboring fronds.

Having collected what specimens are required and conveyed them home, the next process consists of drying them for the herbarium. This is accomplished by removing them from the papers in which they have been collected, and transferring them to fresh paper. Some persons are content with a stout unsized paper, such as employed by grocers for wrapping sugar, others will proceed to blotting paper, whilst the majority will admit that Bentail's botanical paper is decidedly the best. The ferns should be transferred to a sheet of drying paper two or three thicknesses, or even four

or five, may be placed upon it, and then another specimen, *ad libitum*. When all are in this manner transferred, the pile should be placed in a press, or with a stout board above and below, loaded on the top with some heavy weights, stones, bricks, old books, or anything available for that purpose. Twenty-four hours at the least, and forty-eight at the most, they should remain unmoved. At the expiration of this period each specimen should be transferred to a dry sheet of paper, with three or four thicknesses of dry paper between each specimen, and again put under pressure for the same period. The damp paper from which the specimens are taken should be at once dried in the sun or before the fire. It is always advisable to change the papers in which specimens are being dried at least four times during the first week; some persons change them daily. After the first week, if placed between the folds of a fresh, dry sheet of paper once a week, and kept under a moderate pressure for a month, the drying process may be considered complete. No specimen should be transferred to the herbarium in less than a month from the time of its being collected.

There is one small caution which must not be forgotten. A specimen should never be put under pressure to be dried without being accompanied by a small scrap of paper, on which is written the *locality* where the specimen was collected, and the *date* of collection. A name can be added at any time since the specimen itself will furnish the data from which this may be determined, but it will be impossible to furnish localities and dates with any precision at a future occasion, and upon the accuracy of these much of the value of the specimen will depend.

Before the specimen is permanently transferred to the herbarium, it should be *poisoned*, to prevent its injury or destruction by mites and other predacious little pests. A small quantity of finely powdered corrosive sublimate—about as much as will lay on a fourpenny piece is sufficient—should be put into a bottle containing 4 oz. of spirits of wine, and permitted to stand for a day or two shaking the bottle occasionally in the interim. With a small brush this solution should be brushed all over each specimen on both surfaces, and then, when thoroughly dried, it may take its proper place in the herbarium.

Opinions may vary as to many of the minor details of a herbarium, but at the risk of not pleasing everyone, we will present a scheme for the construction and maintenance of a herbarium of ferns.

The paper on which the specimens are to be mounted should not be too thin; a good cartridge paper will answer every purpose. The standard herbarium size is about 18 by 11 inches. This is as large as any one could desire. Each *species*, at least, should have the whole of a sheet devoted to it. The larger ferns will require a separate sheet for each *variety*. The specimens should be laid on the paper with the under or fructifying surface uppermost, and the barren side of the frond applied to the paper. Small strips of gummed paper, about an inch in length, and not more than one-eighth of an inch in width, should be laid across the principal and secondary ribs or branches of the frond, and each end fastened down to the sheet of paper; other pieces may, in like manner, be placed across the tips of the fronds, or wherever else appears to be necessary to secure the specimen to the paper. It may be suggested that too many such slips disfigure the specimens, and if there are not sufficient it cannot be retained in its place. Experience must be the best teacher. Some object to fastening the specimens to paper at all, others recommend gluing them down by the whole surface. Both these plans appear to us to be equally objectionable. If the specimens are

loose, they are not only in danger of being broken or damaged, but of being misplaced or dissevered from the label which belongs to them. If wholly glued down they cannot under many circumstances be removed from the paper, either to be transferred to other paper, or for closer examination or comparison.

Each specimen having been mounted, the label which accompanies it should be fastened down beside it. This may be pasted. Finally its generic and specific name should be written legibly at the lower *right*-hand corner. All the specimens belonging to one genus should then be collected together, and placed between the folds of a sheet of paper half an inch wider and longer, when folded, than the half-sheets upon which the specimens are mounted. These "genera covers" may be of the same paper, or a smooth brown paper may be employed for the purpose. On the outside of the "genera covers" at the lower *left*-hand corner, the name of the genus should be written in a good bold hand. The whole may be transferred to a deal box, the front of which is movable as well as the lid, being hinged to the bottom, so as to fall down and lie flat on the table. The lid may be so contrived as to hold the front in its place when closed. A deal box 9 inches deep, 13 inches wide and 20 inches long will hold a good collection, and if this ever should prove too small for the number of specimens obtained, a second box of the same dimensions will remedy the evil. The order of succession in which the genera are placed in the box may be taken from this volume, which will then serve as an index for the herbarium.

If it is considered desirable, a little camphor may be kept with the specimens, but the best preservative will be to look them all over, and thus allow the air to have access to them, once in every six months. With such precautions a collection may be preserved uninjured for years, provided always that it is kept in a *dry* place —not moderately but *thoroughly* dry —or "mould" may injure irremediably what insects have spared.

A neat little collection of ferns, of smaller pretensions, and less claims, to be regarded in a scientific light, may be arranged in a kind of album or scrapbook, with "guards" introduced by the binder sufficient to compensate for the extra thickness caused by the insertion of the specimens. A tinted paper is often used in the manufacture of these books, which the good taste of a lady may transform into a very interesting volume for the drawing-room table. *From Cooke's "Fern Book for Everybody."*

The Late Baron Sir Ferdinand Von Mueller, K. C. M., F. R. S. Etc., Government Botanist of Victoria.

Scientists throughout the world, but more especially the deceased's numerous personal friends, will be pleased to hear that his executors (Rev. W. Potter, Dr. Alex. Buttner and H. Buttner, Esq.) are—in compliance with the Baron's dying wish—now collecting donations for the erecting upon his grave in the St. Kilda cemetery, Melbourne, of a monument worthy of the deceased *savant's* fame. The monument is of grey granite, 23ft. in height, all highly polished, and will stand in the centre of a grave-plot 12ft. square, planted out with choice specimens of the Australian flora, with which the Baron's name has become imperishably linked. They also will be glad to know that the illustrious phytologist's supplemental volume of the *Flora Australiensis*, upon which he had worked for years, and was preparing for the Press at the time of his death, is to be published, together with two volumes on his administration as director of the Botanical Gardens, Melbourne, and embracing a biography and complete bibliograph of his writings. The executors will feel favored by the loan of any of his letters, or the communication of incidents in the Baron's life which friends may deem worthy of notice in the biography Donations and letters should be addressed—"Rev. W. Potter, 'Vonmueller,' Arnold street, South Yarra, Melbourne, Australia."

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

Correspondence and Items of interest on above topics, as well as notes on the various Museums of the World—views from same, discoveries relative to the handling and keeping of Natural History material, descriptive habits of various species, are solicited from all.

Make articles as brief as possible and as free from technical terms as the subjects will allow. All letters will be promptly answered.

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NOTES.

With deep regret we report the death of J. Maurice Hatch of California also Jno. McKowen of Chicago. Both were enterprising collectors and have long been subscribers to the MUSEUM.

In the death of Dr. Hall of Albany, N. Y., geologists and palæontologists of this country have lost a true friend. A service of 62 years is a very unusual one, and this coupled with the wonderful results which have always followed his efforts, makes his life work one worth perusing.

Our eastern trip—taken since the publication of the last MUSEUM—was a very enjoyable one. Our main headquarters were Edgartown on Marthy's Vineyard Island south of Cape Cod, Mass. It proved a very fair collecting ground but we were unfortunately quite hampered by fogs. Some of the nice specimens secured will be listed up later on.

A Brief History of the Gathering of Fresh-Water Pearls in the United States. *

BY GEORGE F. KUNZ.

The gathering of pearls from the fresh-water shells of North America, although a matter of comparatively recent date among the present inhabitants, really goes back very far into the unrecorded past, and early attracted notice among the first European explorers. In the pre-historic period the Mound Builders of the Mississippi Valley gathered immense quantities of these pearls, as it is amply shown by the stores of them found on the "hearths" of a number of mounds, especially in Ohio, by the recent explorations of Professor F. W. Putnam and W. K. Moorehead. By age, burial and in some cases funeral or sacrifical fires, these pearls have lost their lustre and beauty, but they were evidently highly prized by these ancient people, and gathered by the hundred thousand. The finding of two bushels in a single series of mounds is an evidence of their abundance.

The first explorers who traveled among Indian tribes speak frequently of the number and beauty of the pearls in possession of the natives. Especially marked are these accounts in connection with the great expedition of De Soto, from Florida through the present Gulf States to the Mississippi, in 1540-'41. Garcillasso de la Vega and other narrators give most minute accounts of pearls as worn by the Indians, and the accounts given by them to De Soto at various times, and taken by themselves from burial places of native chieftains, make it quite evident that perhaps all of these referred to were not fresh-water pearls but marine. De Soto's narratives,

*Having had numerous inquiries about Fresh Water Pearls from shell collectors, we herewith present an article from the pen of probably the best posted man on the subject in the U. S. It was originally read before the Fishery Congress at Tampa, Fla., and reprinted in the Fishing Gazette, to which we are indebted for same.—ED.

which were undoubtedly of the former, seem exaggerated, but the recent finds referred to substantiate them. The process is described, moreover, of gathering the shells and opening them by heat, which was shown to De Soto, at his request, by a friendly chief. In the same way, several early English travelers from New England to Florida refer to the Indians as having pearls, undoubtedly from the fresh-water Unionadæ.

No particular attention, however, was given to the subject until about forty years ago. The natives had been dispossessed, and the white race, occupied with other interests and necessities, took little note of the hosts of fresh-water shells inhabiting the streams and lakes, and did not suspect their power of producing pearls. In the rivers of Saxony and Bohemia, indeed, and those of Scotland and Ireland, and the lakes of Finland, such pearls have long been known and valued, although the Unio life is far less abundant than in our great river streams of America, but not until the middle of the present century was any search begun or any important discovery made.

This was all changed, however, by the first great pearl excitement in 1857, when large and valuable Unio pearls were first discovered in New Jersey. First, a pearl of fine lustre, weighing ninety-three grains was found at Notch Brook near Paterson. It became known as the "Queen Pearl," and was sold by Tiffany & Co. to the Empress Eugenie of France for $2,500. It is today worth four times that amount. The news of this sale created such an excitement that search for pearls was started throughout the country. The Unios at Notch Brook and elsewhere were gathered by the million and destroyed, often with little or no result. A large round pearl weighing four hundred grains, which would undoubtedly have been one of the finest pearls of modern times was ruined by boiling to open the shell. Within one year pearls were sent to the New York market from nearly every state; in 1857 fully $15,000 worth. In 1868 it fell off to some $2,000; in 1859 about $2,000; in 1860 about $1,500; in 1860-63 only $1,500. The excitement thus abated until about 1868, when there was a slight revival of interest, and many fine pearls were obtained from Little Miami River, Ohio.

Some of the finest American pearls that were next found came from near Waynesville, Ohio, $30,000 worth being collected in that vicinity during the pearl excitement of 1876. Since 1880 pearls have come from comparatively new districts further West and South, the supply from which is apparently on the increase. At first few were found, or rather few were looked for, west of Ohio, but gradually the line extended, and Kentucky, Tennessee and Texas became the principal pearl-producing States, and some pearls were sent North from Florida.

A few years later the interest extended to the Northwestern States. During the summer of 1889 a quantity of magnificently colored pearls were found in the creeks and rivers of Wisconsin, in Beloit, Rock County; Boscobel and Potosi, Grand County; Prairie du Chein and Lynxville, Crawford County. Of these pearls more than $10,000 worth were sent to New York within three months, including a single pearl worth more than $500, and some among them were equal to any ever found for beauty and coloring. The colors were principally purplish red, copper red and dark pink. Within the past eight years over $200,000 worth of pearls have been sold from this district.

These discoveries led to immense activity in pearl-hunting through all the streams of the region, and in three or four seasons the shells were almost exterminated. In 1890 it extended through other portions of Wisconsin, especially Calumet and Manitowoc counties, and appeared also in Illinois,

along the Mackinaw River and its tributary creeks, in McLean, Tazewell and Woodford counties.

In 1889 the exhibit of American pearls received an award of a gold medal, and the collaborateur a silver medal for the literature. At the Columbian Exposition at Chicago, in 1893, large and beautiful exhibits of pearls, of great variety of tints were set in the finest jewelry in the Manufacturers' Building, and were a notable feature in the Wisconsin State Building and the Maine Building.

The Northwestern pearl excitement subsided in a few seasons, as the others had done in turn before, by the exhaustion of the mussel beds and the consequent cessation of product. About every ten years or so a new wave of interest arises in connection with fresh discoveries at some point where the shells have lain long undisturbed; it again absorbs the attention and excites the imagination of the community around and spreads to other parts of the country, a fresh campaign of ignorant extermination is carried on for several summers, then the yield is exhausted, and there is nothing more but to leave nature to recuperate, if possible, and slowly to restore, in limited amount, the abundant life that has been destroyed.

During the past season of 1897 the pearl fever has broken out in a new locality, attracted attention and awakened similar activity in various parts of the country. This time the scene of discovery and excitement was the hitherto undisturbed streams and bayous of Arkansas These waters teem with Unios and pearls have at times been found by the rural population for years past; but there has been usually no knowledge of their nature or their value. They have been simply regarded as "pretty stones," aud used as playthings by the children—like the first South American diamond that attracted the notice of a trader, in 1866, as he saw it in the hands of the children of his Boer host at the Vaol River. Several valuable pearls, however, were this year found by persons from St. Louis and Memphis, who at once sent them to those cities, and ascertained their reality and value. The same parties then searched for more, and took steps to lease the land where pearls were abundant. Ere long the facts became known, and a wild excitement set in and spread through large portions of Arkansas, extending into Missouri, Kansas and the territory of the Choctaw Nation. The first important discoveries were on small lakes or bayous, formed hy affluents of the White River and its branches, then on the Arkansas, the Ouachita, and the Black, Cache and St. Francis rivers, thus affecting almost all sections of the State. In one district an entire lake was leased, guarded and fenced for the pearl contents of it alone.

The newspaper press took up the subject and published highly sensational accounts of the treasures to be had in what was largely proclaimed as "the Arkansas Klondike." These articles were copied all over the country, and led to a great amount of pearl-hunting in many of the States, both East and West. Iowa, Tennessee, Georgia, New York and Connecticut were all more or less stirred up to activity. The former pearl region of Tennessee was less affected than a new section in the eastern part of the State, along Clinch River, where great crowds have been searching for pearls and large quantities were obtained. The Georgia interest has been chiefly along the Oostenaula, near and above Rome. The New York activity has been in the northeastern angle of the State, along Grass River, in St. Lawrence County. Connecticut has yielded some good results to the searchers on the Mystic and Shepaug rivers—at almost opposite ends of the State.

REASON FOR THE PEARL INVESTIGATION.

In view of the great interest and possible importance of the pearl, the

discoveries from time to time in various parts of the United States, and particularly in the Mississippi Valley, of pearls yielded by the fresh-water bivalve shells (Unionidæ) so abundant in many of our inland waters, I was invited in 1894, to undertaka systematic inquiry for the United States Commission of Fish and Fisheries, to ascertain, as far as possible, the facts relating to the occurrence and distribution of the pearl-bearing species, and the extent and conduct of the pearl industry, as thus far developed. The value and elegance of many of these pearls, especially as shown in the exhibits made by the Columbian Exposition in 1895, the popular excitement or "pearl fevers" at times arising in districts where a few pearls have been found and characterized by wholesale and reckless destruction of of the shells over large areas, the total lack of system in the search for pearls, as contrasted with the methods that have been developed on a smaller but far more profitable scale in Europe, all seems to call for a careful investigation by the Commission, with a view to better knowledge and wiser direction in the matter of inland American pearl fisheries. Undoubtedly for a considerable period after the first explorations the pearl resources of North America seem to have attracted little attention. The Indian race was contending with the whites for the possession of the country; it was a time of uncertainty and strife for both races, and not until the great waterways of the Mississippi Valley had been won by the whites, the region occupied and settled communities established do we again begin to find any indications of the search for fresh-water pearls. For some two centuries the Unios lived and multiplied in the rivers and streams unmolested by either the native tribes that had used them for food or the pioneers of the new race that had not yet learned of their hidden treasures of pearl.

It is with some surprise that one notes that so few American conchologists have paid attention to our native pearls. It is probably accounted for by the fact that the pearls are contained in old, distorted and diseased shells, which are not so desirable for collections as the finer specimens. Collectors who have opened many thousands of Unios have never observed a pearl of value. Pearls are usually found either by farmers, who devote their spare time to this industry, and if no result is obtained suffer no loss, or by persons in country villages who are without regular occupations, but are ever seeking means for rapid increase of fortune. Multitudes of shells that do not contain pearls are destroyed in the search.

HABITAT OF THE FRESH-WATER MUSSEL.

From the many inquiries sent out the general indications from these data are quite plain, to the effect that the shells are chiefly found in rather rapid streams, in which the bottom would naturally be sandy or gravelly, and the water clear. Other species, however, occur in muddy or clayey bottoms where the water is slower. The preferences to rock bottom do not concern so much the immediate surface where the shells are found as the underlying bed on which the softer materials rest. In the matter of depth, also, the large preponderance of answers in favor of shallow streams may mean, not so much that the Unios greatly prefer shallow water, as that they are more readily found and gathered there. The frequent allusions to "hard" or calcareous water tend to confirm the general impression that streams of this kind are favorable to the development of molluscan shells, both in size and abundance of calcareous matter in the water tends to induce the prolific secretion of the pearls.

A Florida writer states that the best Unio growth is found in lakes with outlets, with water pure and fresh, but adds that it is sometimes

sulphurous. A Texas pearler (Colorado, Concho, San Saba and Llano rivers) refers to the water as becoming slightly alkaline in dry times, and another Texas pearler (Colorado and Llano) makes a similar statement. A New York pearler (De Grass River and Plum Brook) mentions the water as brown or black—the clear, brown water of the hemlock districts, familiar in Northern New York.

The general conclusions most clearly brought out may perhaps be summed up as follows: The shells are most abundant in swift and clear water where the bottom is sandy or gravelly and the country rock calcareous. While still numerous in many streams they have greatly diminished within a few years past, wherever the pearl-hunting enterprise has extended, and are at some points nearly exterminated. The pearls found are few, and those of marketable value represent the destruction of thousands of shells for every one obtained. No use is made of this often beautiful material, which is simply thrown away and lost, although for buttons and ornamental articles it would be admirable. The methods of gathering the shells and extracting the pearls are the simplest and most primitive, and the activity of a few seasons generally exhausts the bed.

This state of affairs is one that calls loudly for reform. The wealth of Unios that filled our rivers and streams is being rapidly destroyed by ignorant and wasteful methods of pearl-hunting, and either some form of protection is important, or, if that be not possible, a wide diffusion of information as to better methods and particularly the introduction of tools used in Germany for opening Unios far enough to see if there are any pearls obtained without destroying the animal, which may then be returned to the water.

(*To be continued.*)

My Turtles.

Early this last Spring, while collecting in a small patch of woods several miles from home, my attention was aroused by a crackling of dry twigs, as though some good sized animal was in the neighborhood. The noise was repeated and, on going to its source, I found a handsomely marked Box Turtle, (*Cistudo Carolina*), which was just completing its morning meal, as the small remnant of earth worm hanging from its jaws indicated.

Now Box Turtles are getting decidedly scarce in Rhode Island, and accordingly I was much interested in this find. He was immediately consigned to a large fish basket which I invariably carry on my excursions afield.

Closer examination at home showed that my find had been captured before and was of considerable age, as his plastron was decorated with two dates, one 1887, the other, 1857. The carapax of this specimen was beautifully marked with bright yellow, more so than any other that I have seen.

A portion of the yard was partitioned off and allotted to this animal, who was not destined to remain long without company.

A few days later I secured two Spotted Turtles, (*Chelopus guttatus*), that were installed in the same pen. Shortly after, two more Box Turtles were added and recently I was presented with one of those ugly looking and ugly tempered Snappers, (*Chelydra serpentina*).

A tub filled with water was sunk in the ground for the accommodation of this last arrival and some Painted Turtles, *Chrysemys picta*), an abundant resident of this State.

All of the family seemed content, even happy, with the exception of his serpentine majesty, who was the largest one of the lot and whom more than one visitor pronounced the very image of that sulphurous individual who is supposed to rule over the lower regions.

The Box Turtles were nearly all the same size, about seven inches long, but the difference in marking was very decided, not only as to color but also as to the distribution of the bands and blotches. The color varied from a very bright to a pale yellow. In one turtle the head and neck was almost completely covered with markings, while another possessed scarcely any at all in this location.

From time to time, I had thrown a little grass into the pen until a small heap had accumulated, under which the Box Turtles seemed to like to burrow. Except when thirsty they seemed to dislike the water, and I have never seen them enter it. Once when camping on a small island in a large fresh water pond, a Box Turtle which I had secured to a tree with a long cord, made wild endeavors to get into the water.

At first, when approached, their heads would disappear with a hiss and the curiously hinged plastron would then close up, concealing all unprotected parts from harm. Bt as they grew more used to the confinement and civilization, their sociable nature began to evince itself and they often take their food from my hand.

Worms and meat have been their principal diet while under my care. When rather large worms are given, the Cistudos usually sieze them near the middle of the body, give them a sharp nip and then drop them. This is repeated several times until the worm ceases his struggles somewhat. Then, starting at one end, they commence to swallow and the worm disappears by sections. Cooked meat seems to be rather disliked, and unless quite hungry they refuse to touch it. But rare meat they eat with avidity. It seems that they are vegetarians also, as it is stated in "Johnson's Natural History," that they live on "fruits, insects, edible mushrooms, etc." I have made no experiments with a fruit diet as yet.

Both in shape and manner of eating the Box Turtle greatly resembles the huge Tortoise of the Galapagos Islands, which the writer had fine opportunities to study, in their native haunts last year. This Tortoise, however is a strict vegetarian.

Today, August 3d, two things have happened one of which causes me pleasure, the other sorrow. Firstly, one of my Box Turtles laid three eggs. These eggs are much elongated in shape, measuring one and a half inches in length. The shell is like heavy parchment and white in color with rather an opalesent tinge, I thought, when first laid. I found them on the top of the ground. None of the eggs laid in captivity ever hatched. A note dated April 3d in my Journal of 1895 mentions preparing a "Box Turtle, female, containing several eggs ready to be laid. Specimen had been dead several days." The great difference between these two breeding dates caused me to insert this note.

I shall be pleased to hear from any reader of the MUSEUM in regard to the breeding habits of our land and fresh water Turtles.

The cause of my sorrow was the escape of my Chelydra, and I fear that this time he has gone for good. On two previous occasions he has managed to get out of the pen but has been recaptured. This time, however a careful search has met with no success. No, I spoke too quickly, he has returned. Just after penning the above lines, the door bell rang and a neighbor (how nice it is to have a reputation as a crank) returned my Turtle which he had found wandering up the street and collected, thinking that probably it was one of my pets.

The long tail and large head of this reptile gave him rather an ancient appearance. He is fully ugly enough to take his place among those curious reptiles of previous ages. My specimen, as is usually the case, is partially covered on the back with moss, and at the time of his arrival had several leeches clinging to the under side of

the body near the edge of the plastron.

I have been unable to get up any meal of sufficient excellence to tempt him, or perhaps it is homesickness that causes him to refuse. I expect that hunger will compel him to eat before long.

The lowest wall of the pen is nearly three feet high, perpendicular and of fairly smooth boards, yet this fellow has scaled it three times. I have seen him crawl nearly to the top only to lose his grip and fall back. A minute's rest and it is repeated, I suppose until success crowns his efforts.

His temper has been bad ever since he was first captured. When touched on the neck he will straighten up and make a vicious jab with wide open mouth, at the cause of his trouble; and such a mouth! I should hesitate a good many times before getting my fingers in its immediate vicinity.

About the only other point that I have as yet noticed about him, is that on continued handling he emits a very disagreeable odor which it is difficult to remove with soap and water.

The Painted Turtles (*Chrysemys*) spend nearly all their time in the water, coming out occasionally to sun themselves. In addition to flies and worms they eat small pieces of bread.

The Spotted Turtles (*Chelopus*) are of much the same nature, though they seem to be content to stay out of water. In fact, those that I have, spend most of their time on dry land. This species eats worms and small pieces of meat either cooked or raw, and it is surprising how much one of these little Turtles can eat at a meal. Both this and the preceeding species prefer to have their food dropped in the water. Perhaps later on my Turtles may exhibit some other interesting traits which I can record for the MUSEUM, but for the present I feel that I have used up my share of the space and also the editor's patience.

F. P. DROWNE.

Mice and Moles of Mahoning County, Ohio.

BY E. W. VICKERS.

Of mice and moles including the shrews we have eight identified species in this locality.

The most common of our native mice is the meadow mouse, field mouse or as the farmers are in the habit of calling it the "meadow mole" *Arvicola riparia Ord.* This is an extremely abundant creature in the meadows where it does much damage being perfectly netted with the fabric of crossing path ways in autumn and winter. It is a grotesque and awkward creature reminding you of a dwarfed or stunted muskrat, which it resembles not a little in color.

A more agile and dainty creature is the white-footed or deer mouse (*Hesperomys leucopus*) with its large goggle eyes. In Cuyahoga county near Cleveland I used to find everywhere in osage hedges companies of six and eight of these mice occupying a nest of thistle down made into a ball with opening at the side in winter. And upon the coldest days a little poke with a weed stalk was sure to awaken the snug but light sleepers within. I make this note because the deer mouse is sometimes spoken of as a hibernating mammal. However, it may be in other portions of its range, it scarcely merits admittance under that head here, as I will shortly prove. Hereabouts I have not, so far in a residence of six years found a nest occupied by *Hesperomys* in hedge or tree. Here it occupies a hollow stump, holes in trees or logs and in buckets and under crocks in sugar-houses.

Though several cases of nests that would fill half bushel measures made of grass and grage vine shreds early in winter in the rose bushes of a swamp led me to think the white-footed mouse had built them, as the side opening was just his size and as I could attribute them to none other of our little mammals. Traps set failed to take

the little owners of these snug winter quarters, who ever they were.

Our other mouse resembling much the little white-foot, the jumping mouse (*Zapus hudsonius*) or kangaroo mouse as the rustics call it, is much shyer as well as so much rarer, although I have not seen it leap ten or fifteen feet at a "spang" as some record, yet it is a most wonderful jumper, with its disproportionately long hind legs and tail much longer than its body, some times twice as long. There seems little doubt about the hibernation of this species. It burrows below the foot line, and sleeps till spring unlocks its prison home and calls it forth. Yet one of my correspondents assured me he had seen its tracks in winter. This helped me to fall into a mistake which it may be interesting to note.

In my field note book for Feb. 20, 1896 I find the following observations: "Ten below zero this morning and has not been above zero all day. Out in the Huxley woods I saw what appeared to be the tracks of a jumping mouse, looking as the snow-powder had obliterated them not unlike a capital q with a long tail which was actually 4.5 inches long. The legs all came down together, the tail printed in a graceful compound curve in the fine snow. The tracks were from 10 to 18 inches apart, mostly between these two figures. If these are the tracks of a Zapus, he is certainly a poor hibernator. But was it *Zapus*? Could any other mouse make such a track? No other one has such a tail surely. Now if I can succeed in napping the mouse I will have a clincher and surprise everybody, and prove the doctor right who was sure he saw evidence of them in winter."

A few days later I wrote this note: "I have put a clincher on my own ignorance and that of others. The deer mouse is capable of making very respectable *Zapus* tracks. I caught my *Zapus* and it proved a *Hesperomys*.

Our commonest mole is the hairy-tailed or Brewer's mole, *Talpoides Brewerii*.

The star-nosed mole (*Condylura cristata*) is almost as plentiful, but seems to prefer rich, loose, mucky soils. We sometimes find specimens which the cats have caught and dropped, or plow them out.

The common mole (*Scalops aquaticus* Cuv.) I have not yet found any trace of.

The short-tailed shrew (*Blarina brevicauda*) is common and wide spread over the state and may be taken by digging pits with a post hole digger along fences or any where amid abundant and neglected vegtation. Where there is rubbish hay or straw stacks rotting away is also a good place to catch them.

The least shrew (*Blarina brevicauda parva*) appears to be rare but careful search may reveal its general distribution all over its range in Ohio. So far this little mammal has been taken as far as records show, in only three localities in Ohio. Dr. Langdan in Vol. IV Zoology and Botany of the Geological Survey of Ohio records a specimen taken at Madisonville, Hamilton county, saying, "It is probably found in southern and even central Ohio," basing his conclusion on its extent in Indiana and Pennsylvania. My friend George J. Streator of Garretsville, Portage Co., O. took a specimen in 1895 at that place which is now in the historical museum. And in August of the same year the writer captured his first *Parva* (now No. 30216 of the Department of Mammals of the U. S. National Museum) in Ellsworth, Mahoning county. Since that time I have collected several more. The interesting point is that these last two localities carry it so far beyond the central portion of the state. Now how far does it extend northward?

And last that dainty little creature the marked shrew (*Sorex personatus*) which was not noted in the Ohio Fauna till the writer took it in Ellsworth, Mahoning county in July of 1893, and has not yet, so far as he is

aware been captured elsewhere.

Each season I take a few of these desirable specimens.

Dr. James Hall, State Geologist.

James Hall, LL. D., died at Bethlehem, N. H., on August 8th, aged about 87. He had been geologist of New York State since 1836. A service of 62 years in one public office is remarkable. In Dr. Hall's case it was a useful service.

When the geological survey of the State of New York was organized in 1836, Prof. Hall, who was then a teacher in the Rensselaer School, now the Polytechnic Institute, in Troy, was appointed assistant geologist in the second geological district, and in 1837, State geologist in the fourth geological district, which really made him the State geologist, a position which he has held ever since. From 1838 to 1841 he published annual reports, and in 1843 a final report showing the order of the strata and their organic remains. In 1843 Prof. Hall was also given charge of the paleontological department of the survey, in which he was engaged at the time of his death. It was Dr. Hall who set the first stone markers at Niagara Falls, whereby the recession of the cataract has been accurately measured since 1842.

In spite of small and irregular appropriations by the State, Prof. Hall has published seven quarto volumes of "The Paleontology of the State of New York," which are amply illustrated. Being discouraged by the lack of appropriations, Prof. Hall, in 1855, accepted the paleontological part of the Canadian survey under Sir William E. Logan, and was about to move to Montreal, when Prof. Louis Agassiz and many other scientific men begged of him to remain in this country. It was promised that the State of New York would be more liberal with appropriations; but it was not, and Prof. Hall looked on his decision to remain here as the mistake of his life, a large and more inviting field being the Canadian one. Although still remaining in this country, Prof. Hall, in 1865, published a description of the graptolites of the Quebec group. In 1865 he was appointed State geologist of Iowa and in 1860 the chief commissioner to make a geological, mineralogical and agricultural survey of Wisconsin. On the reorganization of the New York State Museum in 1866 Prof. Hall was appointed its director, which title he continued to hold, together with that of State geologist and paleontologist.

Prof. Hall had, probably, as many titles as have been conferred on any American citizen. There were about 30 in all, including LL. D. from Hamilton College, Harvard College and McGill University. He was a member of many scientific societies both in this country and abroad, and he received several decorations from Italy, France and other countries.

The Cicindella Beetles.

The tiger beetles, or *Cicindellidæ* comes under the head of beneficial insects, as they and their larvæ feed exclusively on insect prey.

The larvæ looks rather ferocious and are armed with large jaws, and a hooked hump on the ninth segment, which aid them to climb to the mouth of their holes in sand banks, where they wait for their prey.

The beetles are very active and handsome creatures, with large heads, long curved and formidable looking jaws, and long slender legs, with which they run about the sand hills with considerable agility. When collecting them, I noticed a peculiar trait they have. When the sun was hidden I secure them with ease, but when the sun was shining they seemed to become more alert and active and I could not come near them. They would allow me to approach until my shadow fell full upon them, and then becoming alarmed they flew away. When flying they make a loud buzzing noise similar

to that made by a large fly or a bee.

We have four species of tiger beetles in this part of Ontario, *Cicindella vulgaris* being the most common. This species has been met with as far west as the Rocky Mountains. It is a large beetle with light-brown colored wing-covers, with angular lines of a yellow or a dingy-white running in from the edges. Its under sides—like all the rest of the genera of Ontario—is of a metallic green color.

Cicindella purpurea is a bright green species, although there is also a variety which is slightly purple. This is a very handsome beetle. It has markings similar to those of the preceeding species; sometimes only with cream colored spots on the margins of the elytra. I have met with beetles of this species in the woods, usually on top of a large boulder in an opening where the sun could shine on them. On one occasion, I captured one on a boulder, which was devouring a small dipterous insect. I felt the stone with my fingers and it was almost like putting your hands on top of a hot stove, from the heat of the sun. It is also met with on dry dusty roads.

Cicindella histicollis, or as it is called, the hairy-necked tiger beetle, is slightly smaller but almost identical in color and markings with *C. vulgaris*. This species is not quite so common as the two preceeding.

Cicindella sex-guttata is also a very handsome insect. It is of a bright green color with six golden spots. This species is rare compared with the others.

Another species, *Cicindella generosa* occurs within the boundaries of this province; but I have never met with any in this locality, nor have I seen any in the collections of any of my friends.

W. J. WINTEMBERG,
Washington, Ontario, Can

DAVIES "Nests and Eggs." See our advertisement in another column We have a new supply and can fill orders on a moments notice. W F. WEBB, Mgr., Albion, N Y

Variations of Nesting Sites.

Quite a while ago I noticed in the MUSEUM an article on the Chimney Swift nesting in trees and the extreme rarity of their actually using chimneys as a nesting site. The note was I believe from New York. A short time ago I also noticed in *Popular Science News* an article from Connecticut on the ground as being an unusual nesting site for the Mourning Dove. I presume that the environments in N. Y. and Connecticut are quite different from Indiana, for here both occurrences are quite common. In fact, I have never found *C. Pelagica* nesting in trees in this vicinity while within a radius of five miles I know of a score or more chimneys which furnish shelter for their nests. Generally these are the chimneys of dilapidated, unused buildings but the chimney of one of the city churches became such a favorite site that it was quite a nuisance. The country around here is well wooded with natural forests and why they should not nest in trees here as well as anywhere else, I cannot say.

As to *Zenaidura L. macroura*, they nest *everywhere*. They are extremely abundant in this locality and I have found them on their nests every month but November, December, January and February. I have taken their nests in forest trees,—quite high up from the ground—in apple orchards—which appear to be their favorite locality in hedges, on fences and quite often on the ground. Of their ground nests perhaps the majority are placed in stubble fields. I have, however, found their two eggs on the bare ground of a corn field and also in the rank grass.

Strangely opposite to this is the fact that, although the ground is often given as a favorite, and, indeed, the general nesting site of the Brown Thrasher, they do not appear to make use of it here. I have taken several nests from brush heaps but have never seen it placed directly on the ground. Its favorite resort seems to be some low,

thorn hedge. Another much used place is the common rail fence wherever this is overrun with vines.

Such variation of nesting sites seem to be more like "a prevailing style" than to be caused by any marked physical differences.

Greencastle, Ohio, June '98.

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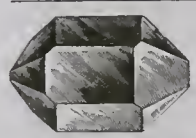

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CALIF. CONDAR SKIN. We have a nice skin for sale. Collectors wanting such apply for price. W. F. WEBB, Mgr., Albion, N. Y.

Swallow-tailed Kite.

BY KET ATKINSON.

This beautiful species, noted for its graceful and elegant flight is fast becoming rare. Twenty years ago they were more abundant than all the Kites and Hawks combined in this locality but in the last ten years have disappeared with remarkable rapidity.

There have been more eggs of this bird collected in this locality perhaps than in any other but few more may be expected. This season I had many people collecting for me besides I travelled over 200 miles in search of Kite eggs and only secured one. It was a set of three which is very unusual. It was collected June 16th this being 20 days later than the latest ever collected in this country and strange to say incubation was only slight. The set went to Mr. A. W. Johnson of England.

The nest of this species is always built in the top of tall trees in the bottom lands. It is composed of Spanish moss and sticks lined with green moss. I have collected many sets and three eggs is the largest number I have taken from one nest.

In color they are dull white to white speckled and blotched with redish to daak mahogany brown. There is but one other bird in this locality that lays an egg that is very much like the Swallow-tailed Kite egg and that is the Florida Red-shouldered Hawk. Their eggs are marked very much like Kite eggs but nearly always larger although I saw one Hawk egg that the oldest oologist that ever saw the moon could not tell from the Swallow-tailed Kite Egg. It was the right size and color, I mean it could not be determined till it wys blown. Right here I will give the young oologist and perhaps some of the older ones a pointer. When blown, by examining the inside of a Florida Red-shouldered Hawk egg the egg the color will always be seen to be bluish green while the Swallow-tail Kite egg is creamy white and besides show the markings through the shell.

The food of this Kite consists of small snakes, grasshoppers, lizards, crickets, young birds taken from other nests, birds eggs and young wasps. They will dart by a wasp nest and snatch it, eating the young wasps from it while on the wing. In fact they eat nearly all their food while on the wing, and have been truly called "The Queen of the Air".

I hope to hear bird notes from other collectors in the field.

WANTED:—The following back numbers of the MUSEUM: October, 1896; November, 1896 and February, 1895. For any of above numbers we will give any two other numbers or pay 10 cents each cash. W. F. WEBB, Mgr., Albion, N. Y.

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JOHN B. WHEELER,

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THE MUSEUM.

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VOL. IV. ALBION, N. Y., SEPTEMBER 15, 1898. No. 11

The Feathered Friends of My Door-yard and Garden.

E. W. VICKERS.

When the last of the latter autumn days—the solemn, rather than "the melancholy days," to me—are gone, and winter with all its snows and ices has settled down, we delight to dwell upon the domestic economies of our familiar feathered neighbors, who spent the summer with us, entertaining us during many spare moments of observation.

If your door-yard and garden are well supplied with trees and shrubbery, or if a woods is only a few rods from your dwelling, the results of your studies cannot but be abundant and interesting. Birds love foliage, and many are the natural guardian-spirits of trees. With the writer, the lack of door-yard and garden trees has been the chief cause of the poverty of his observations, while the woodlands on east and west have been driven almost a half a mile away. The orchard is also too far away to have any influence on the inhabitants of the door-yard and garden. Yet, notwithstanding these drawbacks, forty-four species of birds have been recorded as residents and visitors of this little spot during the past year. Of this number however, only a few nested about the house. The few notes which I have to offer are intended rather to induce others with more time and more favorable surroundings to become interested in the facinating field of personal observation.

One of the first birds to return to us with the glad tidings of returning spring is the Robin.

A pair has nested with us for two years, the history of whose household experiences is somewhat chequered. A year ago they built and plastered their little cottage in the garden pear tree. Eggs were laid, and life moved along smoothly and pleasantly, till one morning a mischievous rascal, an egg-sucker, in the fine, painted person of a sassy Jay, broke the eggs, what he did not eat, and had a fight with the Democratic pair. I did not see all the battle, but found a punctured egg in the tanzy below and on climbing the tree found the nest empty. How many nests these sharp-eyed, handsome rascals—these house-wreckers in feathers must have laid to their charge! I thought this Robin's nest in its isolated tree safe from their search and robberies.

Yet for all this hardship and unpoetic experience of the day before, next morning I heard Mr. Robin blightly singing his "Cheer-up! cheer-up! cheer-up!" Yesterday was wiped clear out and with yesterday its experiences. How many people ought to go and learn of the Robins, that sufficient unto the present is the sweetness thereof. Let the sunshine of the present hide the shadows of the past.

The pair immediately went to work and built a nest in the old apple tree in the meadow across the road, raising a brood without mishap. Then they built a nest in the apple tree in the door yard, where they raised the second and last family for 1896. This year they came back to the same door-yard tree, building on the same limb, only a few feet from last year's nest. Everything went well, eggs were laid and hatched early in May, the four young growing at a surprising rate, as little birds will if you give them time and worms,—when one morning an evil and black spirit in the shape of a

cannibal Crow, visited the tree, and before assistance could be rendered he gobbled a little bird. Upon discovery he flew up into the locust tree, whence he fell to my father's gun. He now sits with becoming solemnity and sedateness on a shelf of my museum, a monument to himself and his unconscious wickedness. There could be no question of his guilt, as I found the young Robin, head, legs and all intact in his stomach—swallowed whole, like an oyster or other dainty.

Here was circumstantial evidence that the shrewdest Yankee lawyer could scarcely get around. The three remaining birds lived to attain the full proportion of feathered Robin-hood, and another brood was reared in the same tree with an uneventful history. So it will be seen that there are ups and downs and ins and outs and movings and tragedies even, in the affairs of birds as well as in those of men.

Late in April when the willows along water courses turn to green lattices and the rough arms of old orchards are pranked with the dainty freshness of green buds, that animated sheaf of gold held together by a silver band of song—the Yellow Warbler, comes to us again. I remember, that in early oological days we boys used to call him the "Salad Bird," not an unfitting name either as his golden-green coat most vividly oalls to mind its like in the bed of crisp yellow-green leaves growing in your lettuce bed in the garden. This dainty little pair of winged-nuggets love to nest in our lilac bushes. Anu it is a picture long to be remembered, to see the sunny pair amid the green branches, weaving their "procreant cradle" of the bright silver fibre of several species of milk weed (*asclefias*). He is all activity, all enthusiasm, all song, as he catches insects.

A pair of Chipping Sparrows—the "Hair-birds," of the farmer boys, built their nest in the ampelopsis vine that overhung one of my second story windows. Here when I could look out on the five blue-green, black-speckled eggs which bloomed out presently into five growing young, the pair lived a happy and unmolested honeymoon or more. Not so was it with the couple which built their nest in a garden plum tree. This bird is a notoriously poor nest builder, never fastening it to the branch, the nest looking more as if some one had taken it from some other tree and stuck it up where you find it. Well, a storm came and the plum tree nest and its fragile contents were dashed to the ground. And other nests of this species in the garden have fared no better.

A Phœbe or Pewee built its nest up on the flat top of a bracket of the cornice under the eave above my window. In early mornings I could see the shadows of the birds ascending and descending on the curtain of my window, as they tended the hearty eating family. Their favorite perch-place was the wire clothes line. There the male would sit and reiterate his rather monotonous "Pee-a-wee! Pee-a-wee!"

I had tried to induce Wrens to nest on the premises but without success. For several years I had two tempting boxes nailed up on the brick wall just outside my bed room window. One May morning in '96 while working in the garden I heard a Wren singing with all his might "in the apple tree just over the way." "Now," said I to myself, "I am going to capture that little fellow to sing for us all summer." So I hurried up stairs, took down one of the boxes, brought it down and nailed it up in the pear tree. And in less than ten minutes Jennie Wren took formal possession by withdrawing after a barely inspection of the interior and returning with a twig forthwith. Having put that much furniture in, he sang around for a while, then left, returning in a few days with Jenny whom I suppose he had found, woed and won mean time, on the principle that,

"Happy's the woeing, that's speedily doing."

Now strange as it may appear his little mate did not agree with him in his choice of boxes. She discarded the one in the pear tree and began building in the one on the wall by my window. Did she know that cats can climb trees, but that a "cliff dwelling" is safe even from felines? Well, to make a long story short—for if I told of all the singings, the comings and goings of the worms and "bugs," the story would be long indeed. They raised a fine family of six. But for all the activity the little master found plenty of time for his song-feasts—for such they seemed to him. "Did-you-say-you-ever-saw-such-a-pretty-lit t le-birdie!"—to be repeated as rapidly as possible, in a semi-whisper, so as to bring out all the sibilants—is what the little egotish seemed to say. How they spied into and under everything in quest of insects, up and down every pailing and unner every scantling, and between the stripping of the sheds, even stealing "bugs" which spiders had taken in their nets and for all I know the spiders themselves.

And what a time they had coaxing some of the timid little fellows to try wings, and fly down from the box to the peach or service berry tree below. One little fellow was very much frightened at the idea, and used his wings vigorously, but clung on desperately with his feet meantime. But at last courage came, and he went down alighting awkwardly in one of the trees. The old birds now conducted their family to the bramble-patch in the orchard, there to finish their education, teaching them to fly, and catch insects for themselves.

This year I missed the little couple. I am inclined to think that a neighbor who put up a little more stylish Wren house than mine entertained them the past summer. If so I give him fair warning that I will strive to beat him at his own game next time.

Chimney Swift occupied a chimney which was used all summer, appearing to be in no wise discommoded by the wood smoke which passed up its neck all summer long.

The Gold Finch or Thistle Bird is a constant visitor of my garden all summer and in winter also. He is extremely fond of beet leaves, the edges of which are all in tatters through his banquets. He is a lover of lettuce seed and becoming fond of that of the vegetable oyster—salsify. An interesting thing which I noted in this bird was his occupancy of an old Yellow Warbler's nest. Why was this?

Among the visiting birds which give me pleasure, are the feathered cherry-lovers. The two "pie-cherry" trees in the garden are an irresistible attraction to the Robin, Catbird, Oriole, Flicker and Red-headed Woodpecker. How do these birds, none of which save the Robins, live handy, know just about when it is time to look for ripe cherries? That is something I have not settled positively, unless their eyes catch the ruddy gleam of cherries amid the foliage as they fly over. For over a week the Red-headed Woodpeckers have been visiting our trees, the saucy marauders! How they hammered on the ice house and summer house roofs! They are neither afraid nor ashamed to tell you they are about, not they! I like to see them enjoy a cherry for they do enjoy it beyond a doubt; not as that wasteful spendthrift the Robin does, pinching a bit of the cheek of a cherry then dropping it to the ground. But the Woodpecker takes a cherry in his beak and flies away or into a tree near, sticking it in some hole or crevice in the bark, leisurely pecking at it—sipping at it, tasting of it almost—daintily, enjoying it as you would an orange or a glass of lemonade. I have thus seen him spend five minutes over a single cherry. I never saw anybody or anything get more pleasure or profit out of a cherry than this bird does.

Prince Red-head would be the last bird I would drive out of my cherry orchard if I had one. I like that saucy cry; that rattling, wooden tattoo; that flash of bronze-green-black,

white and scarlet, in the air or bobling in the fruited cherry tree. I can enjoy them as well as cherry pies.

And how often at this season as I go about garden work do the quaint Catbirds, hhere only after a few cherries, scold me as if I were the robber, and they held a mortgage on the crop.

Pleasures of Entomology, and Some Suggestions to Beginners.

By Benj. O. P. Kittleman.

I. REMARKS FOR THE SKEPTIC.

In all the realm of learning there is no subject which has more fascination for its adherents than Entomology or the study of insects, scientifically and economically. Geology, Paleontology, Botany each have their interest but entomology has a charm peculiarly its own, associated, as it is, with fresh air, the fields and woodlands. Take a trip with an enthusiast some bright day when all Nature is smiling and you will catch the inspiration. It is in us all and needs but the calling forth. We all love the beautiful and harmonious. What better place can we go to find them than

Under the open sky?

Nature is full of sublimity, charm and inspiration and she is willing for us to draw from them at our will. If the lover of Nature will persistently follow her through her outward manifestations she will bring him at last face to face with the Ideal. Such a pursuit will take him beyond the world of shadows and strife. The more we study rocks, plants, insects, or observe the heavenly bodies in illimitable space the closer are we brought in touch with the Divine. "A spiritual interpretation is the only key which can unlock the motives and mysteries of cosmic forces, and reveal the rhythmical order of their operations."

There is no disputing the fact, that from remote antiquity the attention of observant minds has been more or less attracted to the wonders of the insect world about them, and in the records of those ancient times which have been preserved to us we meet with frequent references to them, commending their industry and foresight and condemning the ravages of others. It is not difficult to account for this. The splendid and gorgeous hues of many, the remarkable forms of others and the curious habits of each are well calculated to excite the admiration of all, even those ignorant of them, in a scientific way.

Insects play a most important part in the economy of Nature. which becomes more important as our knowledge of them advances. The average townsman can hardly appreciate this fact as usually his knowledge of them is confined to certain household pests and consequently he can entertain no other feeling than contempt and disgust for the annoying hexapods of his very limited acquaintance.

Yet, they not only vitally concern man but as scavengers, as pollinizers of our fruits and flowers, or as food for other animals they are seen to be absolutely essential to his very existence. Hear what that noted observer, John Lubbock has to say on this subject. He says "Neither plants nor insects indeed would be what they are, for the influence which each exerts on the other. Some plants, indeed, are altogether dependent for their very existence on insects. We know now, for instance, that certain plants produce no seeds at all unless visited by insects." *Trifolium pratense* or red clover is one well known instance of this dependence and it is dependent on our common bumblebee, that great awkward fellow that goes buzzing over our fields and pastures in mid-summer.

The next instance I might cite is that of the scavengers, the *Necrophagae* or burying beetles, which dig pits for any stray dead mouse or bird and cover them with earth that they may have a decaying mass of flesh in which

to deposit their eggs. It is to their industrious efforts that the wholesome air is not tainted with decaying carcases, as it might be otherwise. Besides the two cases I have mentioned, there are many others I might cite. We are familiar with the effects of the honey-bee, and silk worm, and the beautiful dyes made from the dried bodies of *Coccus cactiva*, a lady-bug which hails from Mexico. That fine variety of white wax we sometimes see, is the excreton of tiny insect that lives upon an evergreen tree in China and Siberia. Shellac and our lac dyes are made from a resinous matter execreted by *Carteria lacca*.

Insects have even contributed toward the food supply of certain nations. The Arabs eat some species of locust and consider them a great delicacy. The aborigines of Australia eat many varieties of *Coleoptera* particularly *Longicorns* and *Rynchophora*. They also eat various hairless larvæ. The Mexicans eat a species of water insect and the people of Egypt eat them also. Insect eggs are considered a dish fit only for the rich in Siam.

They have a greater geographical distribution than any other class of the animal kingdom. Indeed no part of the earth's surface can be said to be free from the little beings. Fossil remains have been found in the Arctic regions at the very highest point reached by man. Several species of butterflies have been found as far north as eighty-three degrees North latitude. Some species of water striders (*Hydrobatidæ*) are found on the ocean many miles from land. But as a general rule the largest and most brilliant species are found in the tropics; the same as the most ferocious beasts are found in the warmer latitudes.

They greatly outnumber the other classes, and as a great portion of the globe has never been entomologically explored, it is safe to say the number will be greatly increased as the science advances. The late Dr. Riley estimates the number of species of insects to be not less than 16,000,000. The Coleoptera is the largest of the orders. Packard says that the number of living species is between 60,000 and 80,000 of which 8,000 are known to inhabit the United States.

We are very prone to boast of the achievements our own genious has wrought but did you ever think that insects have forestalled us in many of our useful arts? Yet such is the fact. I claim that insects have a large amount of ingenuity,—yes, intelligence, in contradistinction to that vague, ill-used term instinct—of perseverance, and patience. We are too quick to conclude that because man is big and mighty, that gray matter cannyt exist in small organizatons.. A greater mistake than this was never made.

Did you ever watch a spider constructing his web and note the intelligence shown by it in fastening each thread securely and in having each line cross at the proper angle; and the perseverance and patience shown by it in re-spinning when ruthless hands have repeatedly destroyed the delicate fabrice? Or consider the genius of the bee in constructing its cells with almost mathematical exactitude? A few moments thought will covince you of the correctness of my claim.

Our greatest engineers and architects aro outdone by so insignifcant an insect as an ant. They dig galleries and tunnels many times greater than those to which we are accustomed to point with pride; and were it possible for human ingenuity to construct edifices as great in proportion to us as their structures are to them, they would be appalling in their magnitude. The builders of Babel were not the first to use stone and cement. The stone-mason bees build their houses of grains of sand formed into masses with their own viscid secretions. And that great invention the diving-bell was first used by an aquatic spider.

All their operations are performed

with admirable precision and the method used is always the best that can be devised to attain the best results. They use their own instruments, too, which are no less remarkable than themselves. All the tools of the artisan are represented—tools such as saws, files, augars, gimlets, knives, scissors, forceps and lancets.

The care with which insects provide for the well-being of their progeny furnishes another remarkable exhibition of so-called instinct. The great majority of insects never see their young, dying soon after the eggs are deposited, yet the eggs are always placed where a supply of food may be within reaoh of the larvæ the moment they emerge from the egg.

Thus it is that our fields and orchards are devastated by them. In the early history of our country insect ravages were almost unknown, for the reason that great areas of land were not cultivated with one species of plant to the entire exclusion of any other. Dr. Lintner once said that two-hundred years ago, when there were no apple orchards in New York, there were no apple insects and when the first trees were planted, the insects flew many miles to find a suitable place to deposit their eggs. But now when hundreds of acres are laid out in splendid orchards, presenting an unbroken mass of foliage apple insects find trunk, branch, root, leaf, bud, and fruit lain out like a feast to appease their voracious appetite and hasten on their ruinous growth.

The rapid changes in the physical features of our country owing to its rapid settlement have helped in a great measure to make our vegetation more liable to attacks than they were.

It has been stated, I presume upon good authority, that our agricultural efforts have been injured fully $500,000,000, a year by insects and fungus diseases. This could scarcely fail to give importance to an enemy, singly insignificant, but collectively a plague, against whose distructiveness the farmers have felt themselves well-nigh powerless to cope.

While it would be impossible to fully protect our crops from the many species of insects that ravage them, Economic Entomology strives to lessen the total loss to the farmer as much as possible. To do this the life, history and habits of each and every species with their natural enemies must be recorded; by this means it is learned which are beneficial and which are injurious. The utter inability to distinguish between friend and foe is the greatest fault of the farmer. He often destroys both good and bad in his blind efforts to save his crops.

This is the mission of the entomologist. It is to his credit that each year sees new methods arise and our grain and fruits become better and better. He has given us rational methods, methods based upon years of observation. He has given us the best artificial means for the erradiation of the insect evil that his scientific training can device. He discovers the truth about Nature and leaves to posterity a wealth of facts, in a form available for his successor. And thus the good work goes on.

In my next paper I will endeavor to give a few practical hints, from my own experience, to the collector regarding outfit and appliances, and how to start a collection.

Mourning Dove.

Mr. Wm. B. Crispen of New Jersey reports finding a Mourning Dove's nest on the 27th of last month, containing two eggs slightly incubated. The nest was entirely of light colored rootlets placed on top of a deserted robin's nest, twenty feet from the ground. The first nest found of this species for 1898 was April 1st.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences.

Walter F. Webb, Editor and Manager

Albion, N. Y.

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NOTES.

We place on record another egg of the rare California Condor secured the third of May this year, having received the specimen since the publication of the last MUSEUM. This makes three eggs of this rare bird we have secured this season but only one was taken in 1898. This last specimen is strictly typical and found in same place as the other two, one egg having been taken each year for the last three years from the same nest.

We regret to learn that the *Osprey* is to be sold owing to the failing health of the editor. Mr. Johnson offers the *Osprey* for sale together with all the eggs, books, &c. he has on hand.

Spiders and Pitcher Plants.

In the insectivorous plants of the genus Nepenthes, a form represented by a number of species and widely distributed over the Indian and Australian regions, as well as in Madagascar, the pitchers or insect-traps, which are usually regarded as expansions of the leaf-stalk, are suspended, mouth upward, at the ends of long tendrils proceeding from the tips of the leaves. The gaping orifice, frequently strengthened and kept open by a thickening of the rim, is protected by a lid, which, while preventing the infall of rain, offers no obstruction to the free entrance of insects. To attract the attention of these animals the pitchers are frequently conspicuously colored in their upper parts, and honey is secreted from glands scattered around the margin of the aperture and on the under-face of the lid. This gaudy and sweetened portion, designed as it is to catch the eye and act as a bait, constitutes the "attractive" area. A short distance within the cavity and below the attractive area just described, the walls of the pitcher are smooth and of a waxy consistency, so that no foothold is afforded to insects, which are consequently precipitated to the bottom of the pitfall if luckless or incautious enough to venture on this "conductive" area. The lower part of the receptacle is filled to a greater or less extent with a fluid, containing among other substances potassium chloride, malic and citric acids, as well as soda lime and magnesia in smaller quantities, and an enzyme which, in the presence of the acids, has the power of digesting organic matter. This fluid, poured out as a secretion from a large number of glands developed in the adjacent walls of the pitcher, is usually crowded with the indigestible remains of insects, commingled with those of which the nutritious tissues are in process of decomposition under the action of the alimentary juice of the plants and of the bacteria which infest it.

The spiders of the family Thomisidæ belong to that artificial section of the order sometimes spoken of comprehensively as the wandering or hunting species as opposed to those of sedentary habit, which spin snares for the

capture of prey. Some of the Thomisidæ live on the ground among vegetable debris or beneath stones; others on the trunks or leaves of trees; others, again—and those are the species that have attracted the greatest amount of attention—frequent flowers, and lurk among the petals on the watch for visiting insects. To this last category belongs the spider (Misumena nepenthicola) now under discussion, a species which invariably takes up its abode in the pitcher of a North Bornean (Labuan) Nepenthes, perhaps referable to the species described as N. phyllamphora; in any case, whatever the name of the plant may be, the Misumena appears to inhabit exclusively the one species, for although several other kinds were found growing in the vicinity, they were never observed to be tenanted by spiders.

According to that skilled collector and trustworthy observer, Mr. A. Everett, who kindly furnished me with the notes forming the basis of the account here given, the pitchers in question are somewhat elongate in shape, and constricted a short distance below the rim, broadening out again as the bottom is approached, and narrowing ultimately to a vanishing point where they join the supporing stalk. Just below the upper constriction the spider spins a slight web, adherent to the wall of the pitcher. This web is not of the nature of a snare or net designed to intercept insects, but extends as a thin carpet over a small portion of the conductive area, and enables the spider to maintain a secure hold on its slippery surface. Here it lives and rears its young, no doubt feeding upon the insects which the Nepenthes attracts for its own use, capturing them either as they enter the pitcher, or perhaps after they have fallen in the digestive fluid below.

So far as procuring food is concerned, this spider would seem to be no better off than those of its allies which live in flowers and capture the honey-seeking insects that visit them, except in so far as it is not dependent upon seasonal inflorescence for a place wherein to lurk. But in one very important respect it must presumably score heavily in the struggle for existence—that is to say, in its means of escaping from enemies.

It is a well known fact that almost all spiders, especially those that occur in tropical and subtropical countries, suffer immense mortality from the relentless persecution of the solitary mason wasps, which at their breeding season scour the country and explore every nook and cranny in the eager search for spiders wherewith to lay up a sufficient store of food for the voracious young wasps during the days of their larval existence. From these enemies the flower-frequenting species have no means of escape, except such as is afforded by quiescence, in conjunction with the protective nature of their colors, attitudes, and form. The slightest movement on their part will attract the notice of the quick-sighted wasp, and bring swift destruction upon them.

Whether or not the mason wasps have the temerity to invade the pitchers of Nepenthes in their quest for victims, there is no evidence to show. Possibly long-billed birds thrust their beaks into the insect-trap to extract any living things or organic debris they may contain. At any rate, the account given by Mr. Everett of the behavior of this spider when threatened with danger points forcibly to the conclusion that the species is subject to persecution from enemies of some kind or other. This collector found that when an attempt was made to capture them by tearing open the pitcher, the spiders, although very active, never attempted to escape from the mouth of the vessel, but ran down its inner surface, and plunged boldly into the liquid at the bottom, ultimately, if still pursued, retreating to its very base, and burying themselves among the remains of ants, moths, beetles,

etc., with which the pitcher was more or less choked.

Although many spiders of semi-aquatic habits, such as Dolomedes, Thalassius, and some species of Lycosidæ, plunge beneath the surface of water when threatened with danger, and escape along the stems of the subaqueous weeds; and although an example of Araneus Epeira cornutus, a terrestrial species, which, however, frequents the banks of streams and marshy country, has been noticed, when disturbed, to drop to the ground, run into the water, hide beneath a tuft of weed, and there remain a minute or so before venturing to climb back to its web, I am not aware that the adoption of water as a city of refuge has ever been recorded of any member of the family Thomisidæ. These spiders, in fact, as already explained, depend for safety upon protective assimilation to their surroundings. Consequently, the habit of plunging into the fluid in the pitcher of Nepenthes, adopted by Misumena nepenthicola, must be regarded, it appears, as a new instinct acquired by the species in connection with the exceptional nature of its habitat; and its behavior carries with it the conviction that the species is constantly subject to persecution from some enemy other than man, whether it be bird or wasp.

Possibly the spiders, when once they have taken up their abode in the pitcher are, like the insects that venture in, unable to get out again on account of the opposition to exit offered by the slipperiness of the walls of the conductive area. If this be so, they would be compelled, in case of attack, to seek safety in the lower parts of the pitcher; and while those too timid to take the plunge, or too weak to withstand the immersion, would be captured or destroyed, their instinctively bolder or physically hardier companions would be saved to transmit their characteristics; and so by a process of elimination and selection the instinct would be gradually brought to the state or perfection Mr. Everett has described.

Lastly, if it be wondered by what means the spider is able to resist the fluid, and to regain its position of security in the upper part of the pitcher, it must be remembered, in the first place, that a great many spiders, as well as many insects, can be immersed in water and other liquids and withdrawn in a perfectly dry state; and in the second place, that almost all spiders, when dropping from their webs or leaping after prey, insure a safe return to the spot they have left by letting out a drag-line of silk, which passes from the spinning mammillæ to the point of departure. A silken thread of this description would enable M. nepenthicola to climb out of the digestive fluid which retains the captured insects; while the nature of the integument and of its hairy clothing would prevent the penetration of the fluid during the short time that the spider remains beneath it.—*R. I. Pocock, in Nature.*

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Albion, N. Y.

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Pleasures of Entomology, and Some Suggestions to Beginners.

BY BENJ. O. P. KITTLEMAN.

SUGGESTIONS TO BEGINNERS.

Perhaps the most enjoyable part of entomology is the collecting. With a net over his shoulder and his pockets filled with boxes and vials the "bug-hunter" goes forth bringing back many a treasure in the shape of a rare beetle or butterfly to be examined later at his study window.

A beginner will no doubt be very much "at sea" when it comes to starting a collection. The great number of tools and apparatus he is advised to get that are "quite handy" makes it very perplexing. An amateur has no need of expensive and complicated apparatus and will find that all "new fangled" appliances can be discarded, one by one, and he will soon learn to get along very well with a very few tools and simple ones at that—tools you can in most cases make yourself.

In all my experience, and I am but an amateur as I presume the majority of my readers will be, I have gotten along with but few. Of these a net, a few wide mouthed bottles, a cork-lined box or two, some insect pins of assorted sizes, a small pair of spring forceps, a spreading-board and a cabinet of some kind in which to keep your specimens are all the tools or outfit you need. An outfit simple and inexpensive.

I have found a common thread-case with close-fitting cork-lined drawers to answer the purpose admirably. This cork comes in sheets measuring 12x4x¼ inches and can be cheaply purchased at any naturalists' supply house. It should be glued to the bottom of the cabinet drawers, with a few brads to hold it in place and the whole covered with white paper.

The net spoken of above is necessary for all kinds of flying insects or for holding under a bush while shaking it or beating it with a stick. The loop is made of heavy iron-wire and should be at least twelve inches in diameter. The ends of the hoop-wire should be soldered into a ferule which fits tightly into that at the end of your net handle. The handle should be about four feet long, of any wood you like, the straighter the better. I use the butt-end of a common, light, willow, jointed fishing pole for the handle of my net and I would not exchange it for the best net you could buy at any Natural History store. Green mosquito-bar does nicely for a net. The bag should be at least eighteen inches deep and have a narrow cloth welting sewed around the top and then it will not tear off from the hoop so easily. If you so desire the hoop can be soldered directly into the ferule at the end of your handle and you will have your net in one piece, but personally I prefer the jointed arrangement.

The vials are used for killing purposes or as receptacles in which to carry home your treasures. When used for this latter purpose they should be two-thirds full of alcohol. Or, after killing your specimen you can pin it to the bottom of the cork-lined collecting box, being careful not to spoil a specimen by breaking off a leg or scraping off some of the scales on a butterfly's wing.

Insect pins can be obtained very cheaply of The Walter F. Webb Co., or any dealer in supplies for the naturalist. There are several varieties,

the bright pins being as good as the Japanned which are said not to rust; but if you have your specimen thoroughly dried I do not think there is any danger of the bright pins rusting. Leastwise that has been my experience. They are of various sizes. The smallest pin should be used that will safely hold the specimen without bending.

The spreading-board is used for holding your specimen while drying. The wings are confined in the position desired by narrow strips of paper. The legs, when it is desired to have them spread out, are held by pins crossing over the leg. The pins are thrust into a narrow strip of cork laid along the middle of the groove in your spreading-board.

If you are intending to become a student of entomology and learn of the the structure of the little creatures (and tell me who would be content to only collect them without study?) there are some other tools you will find almost essential. Among these are a good microscope or magnifying glass, a few needles in wood handles, a small scalpel—a penknife will do—and a guide to the study, of which there are many good ones now in print. There are many good books you can get all the way from 35 cents to $4.50. The books of Comstock, Packard, Weed are excellent. Oftentimes you can get Government Reports and monographs free of charge, simply for the asking. The various state experiment station bulletins have good articles in them and may be gotten by applying for them to the director in charge of the station.

The great question which will confront the amateur is what is the best and most humane way of killing an insect and still in a way that will do the least damage and leave the specimen in the best condition for mounting. There are several methods now in use although every entomologist has his own favorite method. About the best way is with what is known as the cyanide bottle. To make one of these you procure a rather short bottle with as wide a mouth as possible. Then get several lumps of potassium cyanide and break them up about the size of a hickory nut or smaller and lay them evenly upon the bottom of the bottle. Plaster Paris about the constituency of thick cream should then be poured in until the cyanide is just evenly covered and the plaster allowed to set. The bottle should be plainly labeled and always kept tightly corked as the fumes are a deadly poison. This makes a very quick way of killing and it is very simple and convenient. For the smaller insects a drop of chloroform, ether or benzine is as good as anything. I generally carry a small vial of chloroform with a small camel's hair brush inserted in the cork with me on my tramps. A drop is all you need for an ordinary sized insect.

Your specimen should be pinned and dried as soon after killing as is convenient as it is liable to become dry and stiff and give you trouble. The time occupied in drying varies. It generally takes from ten days to two weeks to properly prepare it for the cabinet. The dryer it is the better specimen it makes in the long run. Should you not be ready to mount the specimen you may keep it indefinitely in alcohol. The Lepidoptera cannot be successfully kept in alcohol as a great number of that order are furred, particularly the moths, and when put in a solution the little hairs all cling together and make a sorry looking object out of your "rarity." But for Coleoptera, Hemiptera, some of the Hymenoptera and Orthoptera the following formulæ of Batty can be used with success:

Alcohol	2 oz
Water	2 oz
Corrosive sublimate	½ oz

To this formulæ I generally add a small amount of glycerine.

It would be out of place in an article such as I have tried to make this to say anything as to the characterist-

ics of insects or their structure. I have refrained from doing so, as there are so many good books now published that will give you so much more information than I could in the space at my disposal. I will only say in closing that there is a large field open for anyone who sees fit to work. The science is advancing year by year and one by one the schools and colleges are placing it in their curricula until there is now hardly a state in the Union which has not her experiment station, where the entomologist comes very near reigning supreme. Of the delights of entomology it is not necessary to dwell at length upon more than I have already. Anyone will tell you who has dabbled in it that there is much learning and great pleasure to be derived from an intelligent study of it.

It is not required of you to take long trips away from town or your business. Observe the glories of your own back yard. There is as much more to be learned in the city limits as is now already known. Remember what Gilbert White of Selborne said, "That locality is the richest that is the most observed."

Perhaps the "bugs" will be disgusting to you at first, but stick to it and I will guarantee you will come to admire them for their beauty, graceful forms and wonderful transformations and last but not least, for their intelligence. Become as eager to get a new specimen as a "camera fiend" is to get a new picture, which is certainly saying a good deal.

"Go to the ant, thou sluggard; observe its ways and be wise."

A Pleasure Trip on the Atlantic Coast.

On July 16th last, the writer started on a pleasure trip to the Beach of the Atlantic. Although at various times during the past ten years, we had caught merely a glimpse of salt water, it had never been our privilege to stop more than a few hours at the seaside, and we started out on this trip with high hopes of a good time which were eventually fully realized.

Our ticket read via New York Central the great four track road to Albany, thence by Boston and Albany R. R. to South Framingham. Here we were to change cars and go south to New Bedford, where the steamer would be in waiting to take us along the coast, stopping at Wood's Holl, and thence to Cottage City, and Edgartown on Martha's Vineyard Island

Leaving home at 10 p. m. we arrived in Albany just as the electric lights begin to grow dim, with the faint streaks of morning. As we look out of the sleeper window to the east we see what appear to be stars shining out brightly in the heavens, but before we leave Albany we discover they are really electric lights on the very top of the distant hills We have now left the beautiful level country of the Mohawk Valley, and for some hours will ride through as hilly a country as one would wish to see. Leaving Albany about 4 a. m. it has begun to grow light and a fine view of the country is enjoyed until we get to our next stop at Pittsfield. It is now fully light and everybody is astir. The mammoth chimneys are rolling forth their black smoke ready for the business of another day.

Leaving Pittsfield the ride to Springfield, the capital of the state, is through one succession of hills. And such hills! One can scarcely see the top. Some are covered with forest, others have a sprinkling of grass. Now and then one sees a tiny house down in the valley, apparently lost among the mammoth piles of dirt and rock, which nature has left here in such utter profusion The road-bed we are traveling over is very smooth and firm, being in many places solid rock. The track is necessarily very crooked, and occasionally the builders were obliged to cut through a hill, being unable to go around it easily. As we wind around among the hills,

we pass rapidly through small settlements, and we are led to wonder how the people ever eke out a living, as the soil, what little there is, is too stony and hilly to be cultivated. On inquiry we find that we are now in the midst of the great manufacturing belt of Massachusetts and that the people mostly work in factories, many having worked in them their entire lives

Leaving Springfield our train stops a few moments at the thriving city of Worcester, a place where almost everything under the sun is manufactured. It would be hard for a party to mention a single article of commerce, at least some part of which is not manufactured in this city. The immense number of tall chimneys testifies to its thriving business.

Arriving at South Framingham on Sunday morning we find as we expected when we left home, that we cannot make connections until the next morning, so we take a car, and head towards Boston. As we have plenty of time, and prefer to view the pleasant scenery of the next 25 miles at leisure, we enjoy the electric cars in preference to the railroad.

We are over two hours covering the distance, but it only seems like a few minutes for we are passing through the most beautiful parts of old Massechusetts. We pass through Natick, Wellesley and almost a score of small villages, all of which show vast wealth especially as we roll along through Newton, West Newton and near-by suburbs. At last we are in sight of historic old Boston, all clothed in its Sunday attire. We come into the city in one of its most beautiful parts but as we near the more business portion, the streets narrow down until we reach the now noted sub-way, where the cars go under ground for several blocks. We get out at the park station. But time will not permit a description of our wanderings all that day. Visits were made to some of our Boston friends and new acquaintances made as well as old ones renewed.

The next morning we are up bright and early and headed for the South Coast, New Bedford. We arrive there between 8 and 9 and find the large and commodious steamer at the pier. Soon we are heading out into the mammoth harbor of New Bedford. We do not wonder now that the sailors of olden times found this a grand place to keep their boats and that it was one of the greatest whaling ports in the world in its time. The harbor is very large and furnishes accommodations for hundreds of boats of all sizes, where they will be perfectly safe from the awful tempests of the ocean. In a short time we are out in the broad waters of Buzzard's Bay. We pass entirely through the bay, and as we approach the harbor of Wood's Holl, we skirt through a narrow channel close to the beach. This channel is a narrow strip of water between a long row of outer islands and the main coast of the Cape. The tide runs very swift here, and sail boats frequently have a hard job passing through it. At Wood's Holl we stop off for a day and examine the Fish Commission collections. Many of the specimens we were informed by our friend, Mr. Edwards, who has been with the Commission some 28 years, were then at the Omaha Exposition. Still there were plenty remaining to occupy such time as we had to spare. Outside the buildings, on the ocean side, is a mammoth pen built in the dock, so that sea water can run through it. Whenever an unusually large catch of fish is made, more than can be used in the Biological Laboratory, they are put in this pen and kept alive. Only a short time before our arrival in one night they caught ten sharks, and a large number of dog fish, sting ray, and other large specimens. Many of these were in the tank. While looking them over four students came out to "lasso" a shark, which they needed for use. Needless to say they were not quick enough to throw a noose

over his head, but eventually, after several hard tussles, brought him out of the water with large boat hooks. He put up a hard fight, but had to succumb for the aid of science.

While watching a party of men removing the fry from a lot of fish that had just been brought into the dock, we noticed some small black objects sticking to the heavy planks of the pier. They were covered with spines, which were moving about, raising and lowering, as the water moved through. Here indeed was our first living Sea Urchin. Although having handled many hundreds from all parts of the world, this was the first ever seen alive in its native haunts. The temptation was too great. We had to have him and several of his brothers and sisters in the vicinity.

To be continued

A Brief History of the Gathering of Fresh Water Pearls in the United States.

BY GEORGE F. KUNZ.

PEARL-HUNTING AS A PROFESSION.

As to the principal occupations of the pearl-hunters, or pearlers as they are called, this was answered by sixty-four (64) papers. Of these thirteen (13) say merely that their occupations are various, or that people of all callings are included. The remaining fifty-one (51) papers state more or less definitely, as follows: Farmers and farm hands, 231; laborers, 12; fishermen, 8, and as making pearl-hunting a regular business, 7. Three papers speak of loafers, and one or two of each specified as follows: Stockmen, hunters, trappers, tradesmen, roustabouts, boys and negroes, and the Maryland papers mention oystermen. The term "laborers" as used in those answers probably means, in most cases, farm laborers, as stated in a few instances, and the indication is that two-thirds of the pearl-hunting is done by agricultural people who search the streams when not otherwise occupied—"in off times," as two or three of the papers say. Fishermen are naturally much in preponderance, as they gather the shells for bait.

METHODS OF EXTRACTING PEARLS.

The inquiry as to the mode of extracting the pearls when found received seventy-two (72) answers. A large proportion of these are general, merely saying "by hand," "with the fingers," etc., but about one-third give more or less description of the process. When the shell has been opened, the pearls, if loose and near the edge may be readily seen, and sometimes even drop out. These are, of course, easily taken out with the thumb and finger, or if small, with tweezers or on the point of a knife. If more embedded in the mantle and gills, they are detected by feeling for them, passiffg or rubbing the thumb or finger along and around each valve and about the region of the hinge. The pearls may then be pressed or squeezed out "like the seed of a cherry," but if attached to the shell, must be removed with a pair of nippers. Care is required in opening, not to scratch or injure the pearl. A very few describe different methods; thus one Arkansas pearler speaks of breaking the shells, and a Florida pearler tells of piling the mussels in a dry place to decay, the Oriental method of opening the true pearl oyster, and finding the pearls in the emptied shells later. This method is evidently only practicable where little or no "pearl-hunting" is generally carried on, and the pile of shells would not be liable to inspection and search by other parties than the original gatherers.

TREATMENT OF PEARLS WHEN FOUND.

Concerning the treatment of pearls when found, definite answers were received to fifty-two papers, which in some respects show considerable diversity of usage. The pearls are first thoroughly washed to remove all adhering animal matter, and two papers

speak of using alcohol to complete the cleansing. After this the essential point in keeping or carrying them is to prevent injury to the surface from friction, and the majority of those who describe what is done, tell of wrapping in cotton (14), or soft paper (7), cloth, flannel or silk; several speak of drying them, or keeping them dry. But others would keep them in a liquid—six specifying a bottle of water, and one sweet oil or coal oil. Several speak of putting them into a bottle, but with no accounts of its contents, or whether even dry, though Indiana No. 1 mentions cotton in a bottle, and hence in the cases just referred to, it is impossible to judge what is the probable meaning. Two papers mention keeping pearls in starch, and one "in Irish potato." The effect of sunlight is curiously alluded to by two papers, the former stating that the pearls should be kept from it, and the latter that they should be kept in it.

Six Tennessee papers make interesting reference to "peeling" dull and unpromising pearls, merely by saying that this is sometimes done "with a sharp knife," and a nice pearl is obtained thereby. Alcohol, whiting, chamois, leather, etc., are mentioned, as employed, to produce a good surface of lustre. Two other papers allude to polishing or cleaning pearls, one specifying that it is done "with Irish potato." Two papers say nothing under this head of treatment, save that there is no way to improve nature.

(To be continued.)

Exploring Coral Reefs.

An interesting preliminary report of the scientific investigations by the Agassiz expedition in the Fiji Islands has just been brought to Sydney, New South Wales, and from there to San Francisco. The report was written by Prof. E. C. Andrews, who led the expedition. It states that the progress of boring through the reef at Fannafuti is very rapid. The explorers have secured several rare specimens of coral. The most important undertaking of the expedition in the matter of Crater Lake exploration was the trip of Profs. Sawyer and Andrews to Tavinni and its crater lake, 2,800 feet above the sea level. The start for the lake was made over Razor Back, that led them 3,000 feet above the sea, and from which height they could get a fine view of the lake. The ascent was made with the greatest difficulty and much suffering on their part. The tropical vegetation to the edge of the crater was marvelous in its density. The report says that the growth was so dense that at midday, while cutting paths toward the summit, the sun was entirely obscured, the effect being the same as in a forest when the sun is down and its refracted rays have all but vanished. In some parts it was pitch dark, and their path had to be changed to places which were less hampered by brush and closely interwoven branches overhead.

Passing through this belt into a less wooded part of the mountain they made their way through mud holes which brought them to the crater's edge. From there to the level of the lake was a hard climb down the steep hillside covered with decayed vegetation. A swamp lay between them and the clear water. The two professors sank to their hips in the muck, and the stench from the ground was almost overpowering. It was noon when they landed on a piece of dry ground at deep water. The lake itself is blue and clear, but sounding lines failed to find bottom even when 600 feet of cord had been paid out. Numerous specimens of great scientific value were discovered.

The expedition next goes from Tavinni to Mango, where there is a crater whose rim is a raised coral reef.

THE MUSEUM.

A Monthly Magazine devoted to Ornithology, Oology, Mollusca, Echinodermata, Mineralogy and Allied Sciences

Walter F. Webb, Editor and Manager

Albion N. Y.

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Grand Teton Ascended.

MAN'S FOOT PLACED ON ITS PEAK FOR THE FIRST TIME

Two remarkable feats in mountain climbing have just been accomplished. In one case Mrs. Coburn, wife of the pastor of Trinity Methodist Episcopal church in this city, was the first woman to set foot on the top of Mount Evans, Colorado. In the other, the ascent of the Grand Teton, on the border line between Idaho and Wyoming, often attempted unsuccessfully and by many thought to be impossible, was accomplished by a party made up of the Rev. Frank S. Spalding, formerly of Denver and now of Erie, Pa., son of Bishop John F. Spalding of the diocese of Colorado, W. O. Owen of Cheyenne, Wyo., Frank S. Peterson of Jackson, Wyo., and John Shive of Elk, Wyo. The ascent was exceedingly difficult and dangerous. It was in one place over a ledge of insecure rock overlooking a precipice with a sheer drop of 3,000 feet that the summit of the Grand Teton was reached. The path in places was so narrow that progress was made only by seeking out with the fingers crevices in which to secure a hold to drag the body along. The ascent rivals the most difficult feats of Alpine climbing. Crevasses, snowbanks, glaciers, ice—great fields of it—precipices and crumbling, falling granite, were all encountered.

The Grand Teton is the subject of hundreds of legends among the Indians, and is still a mysterious temple of the Great Spirit to them. It has always been regarded as folly to attempt to reach the summit and when the Rocky Mountain Club's representatives announced that they were going to the top, the Idaho Falls *Gazette* warned them against the undertaking, and advised them to give up a wild scheme that was sure to result disastrously. But they persevered and conquered. The Rev. Mr. Spalding has returned and gives a graphic account of the adventure.

"The party left Denver Aug. 5," he said. "We reached Market Lake, Idaho, on Aug. 8. We secured a team and rode to Jackson's Hole, a two and one-half days' journey At the Hole we took pack horses and made twelve miles on the Teton route, just inside the Wyoming line. Our camp was pitched at timber line on Aug. 10. The camp was right beneath Grand Teton, and it was a sight that I shall never forget, when, early in the morning of Aug. 11; we saw it wreathed with clouds and sombre as if rebuking us for daring to scale it.

"We started at 5 o'clock. We went up something like 900 feet, and being confronted by a wall of rock went down again. Finally we made the valley again and determined to follow it up. We reached our first glacier and found it to be three-fourths of a mile across, solid ice, covered with rocks and checkered with deep crevasses. The glacier led to a snow-

field 100 yards in width The snow was so soft that we had no difficulty in walking over it. Then we came to another rise of rock, from 300 to 400 feet in length and at a steep angle. The rock terminated in another snow bank at an angle of 30 degrees. In single file we began to climb this, each stepping in the footstep of the man in front of him. When we reached the saddle, between the Middle Teton and the Grand Teton, we lay down and rested for a few minutes Refreshed we started up to the saddle between the west spur and the main peak, a point as far as anyone had ever gone before. Mr. Owen found the can he left there in 1891, marking the highest point man had ascended.

"Ice was all around us. Our first attempt to continue our journey was up through an ice niche, but we discovered there was no place to hold to. We were consequently forced to follow a little gallery three feet wide up to the north side. Naturally the north side of any large and supposedly inaccessible peak is thought to be the hardest to climb. But the Matterhorn, which I have climbed, is easiest on the north side. So with the Grand Teton. We decided to stick to the north side, and cautiously made our way along the gallery until the man in front drew back with the remark that it ended in a precipice that shot down sheer 3,000 feet.

"Below the gallery and jutting out from the wall of rock were two large slabs, probably six feet in length, which had been sprung from the main wall by the action of the ice and rain. Behind these, after lowering ourselves to them, we crawled along a distance of twenty feet which brought us to a little ledge under an overhanging rock. The ledge was so narrow that we were compelled to crawl. We encouraged each other by keeping up a natural conversation, but it was with an immense feeling of relief that we crossed the ledge and came to a sort of niche with a small overhanging rock.

"Over this we threw a rope—an action that required a cool and steady nerve and a nice eye. We pulled ourselves up and cut over the 3,000 feet below and continued on up the niche about fifty feet. It was so narrow that we could use our feet, elbows and knees. When we reached the top we went on another gallery for a distance of nearly 200 feet toward the west; then up to another ice niche; in which we were forced to cut five steps. It was sixty feet high and led into a ledge. We followed a snow ridge for 200 feet and then over the sharp, jagged, eruptive rocks, so noticeable above timber line, and clambered with a shout to the top We made it at 4 o'clock exactly. We had been climbing for nine hours.

"I never saw such a view in my life. From the top you look down and see four canons, the Fox, Teton and two others, all over 5,000 feet deep, leading in all directions from the peak on which you are standing. To the west you look down into Teton basin as far as the eye can reach To the north Jackson's Hole and the Yellowstone Park beyond it can be descried. Snake River winds down through its valley.

"On the topmost rock we planted the usual flag of the Rocky Mountain Club and in a copper box sunk in the stone we inclosed a record of the ascent.

"The descent was harder than the ascent, because it was more risky. We had to rope off four places as a precautionary measure, although really there was only one place where it was absolutely necessary."

The Rocky Mountain Club was organized in 1896 for the purpose of exploring high and unknown mountains and making the ascent possible. Any man who has climbed 14,000 feet can become a member.

Almost as notable, if less thrilling, was the ascent of Mount Evans by the Coburn party, of which Mrs. Coburn was one of the most enthusiastic mem-

bers. Mount Evans is one of Colorado's most noted mountains, a little above 14,000 feet high, within plain view of Denver and the central peak is a stretch of mountain range 150 miles in length to be seen from this city. Mrs. Coburn finds her ascent a pleasant reminiscence.

"It was one of the most romantic experiences of my life," said she. "We walked forty miles during the trip to the summit and back. The guide said after it was all over that had he told us how far it would be we would never have had the courage to try it. Then we spent one night at timber line with neither blanket or wrap. The reason was that the horse had been left below with our blankets and tent. The guide went back after them, but a storm was brewing and this made it dark so early that he did not dare bring the horse up and the things were too heavy for him to carry and walk. He did not get up till seven o'clock the next morning. In the meantime we made a big fire, roasted potatoes, sang songs, told stories and tried to keep awake. But finally I could keep awake no longer in spite of the cold. I law down by the fire and went to sleep.

"We got in training for the big climb by constant practice on the hills about where we were stopping. We climbed the three highest mountains near and got so we could go fifteen miles a day walking and climbing regularly before we attempted Mount Evans. And I reached the summit the first of the party I am certainly proud of that. I noticed that the hardest thing in mountain climbing is the first half mile. There is a proverb that 'the last step in a mile is the longest.' But it isn't so in climbing. If you can keep on till you get your second wind, you will proceed with an endurance that will surprise you. We left the Rosalie ranch, four miles from the base of the mountain, at 6 a. m. We reached timber iine at 5 p. m. That was twelve miles in a straight line, but a good deal longer the way we walked it. We spent the night at timber line and started at 8 the next morning making the peak at noon. It was enveloped in clouds, and we encountered a fierce storm of wind, rain and hail, with thunder and lightning all around us. We sheltered ourselves as best we could under the rocks and b' fore we left the peak were rewarded by the clouds parting for about fifteen minutes and giving us a sight of the view we had come to see. The climb was exceedingly rough and rocky, and the trail was indistinguishable except by the guide, who knew where it was."—*The Mineral Collector.*

The Snake and the Rabbit.

KIT ATKINSON.

In riding over the plains of South Texas as I am constantly doing, one meets with many queer antics among nature's animals. A few days since while out with friend G. gathering cattle, my friend says, "Listen, I hear a noise as if a young rabbit was in trouble." We stopped and presently saw the old rabbit (a Cottontail) making a line for the place where we heard the noise. We rode up near enough to observe what was going on and discovered the old rabbit turning end over end and repeating it as quick as flash. She would bite at what we thought was the snake and throw them into the air and then bound for him. We dispatched the snake and found it had coiled itself around the young rabbit and squeezed it so hard its little eyes were bulging out of its head. Apparently the old rabbit had grabbed the young one each time and bit its ear nearly off, cut nearly all the flesh off its hind legs and broken one bone at the heel in her efforts to get away from the snake. Had she applied her sharp teeth to the reptile, she would probably have killed it. It was all done quicker than it takes me to write

it. The snake was what we call a "chicken" snake.

I am greatly interested in the MUSEUM and hope to hear frem many of its readers through the columns.

Ledbetter, Texas.

List of Birds Collected at Alta Mira, Mexico.

We have frequently had calls from collectors going to Mexico asking us what one would find in the bird line in that country. We herewith present a list of birds taken by F. B. Armstrong. The list was prepared by Mr. C. W. Richmond and is part of U. S. National Museum proceedings. We give the common names as well as the scientific:

1. Crypturus mexicanus, Salvadori.
   Mexican Tinamou.
2. Cochlearius zeledoni (Ridgway).
   Central American Boat-bill.
3. Aramides albiventris Lawrence.
   White throated Wood-hen.
4. Jacana spinosa (Linnæus).
   Mexican Jacana.
5. Scardafella inca (Lesson).
   Inca Dove.
6. Geranospiza nigra (Du Bus).
   Black Frog Hawk
7. Micrastur melanoleucus (Vieillot).
   Black and Buff Micrastur.
8. Urubitinga anthracina (Lichtenstein).
   Mexican Black Hawk.
9. Rupornis magnirostris griseocauda, Ridgway.
   Gray-tailed Hawk.
10. Falco albigularis, Daudin.
    White-throated Falcon.
11. Falco fusco-cærulescens, Vieillot.
    Aplomado Falcon.
12. Glaucidium phalænoides, Daudin.
    Ferruginous Pygmy Owl.
13. Amazona viridigenalis (Cassin).
    Crimson-fronted Parrot.
14. Amazona autumnalis (Linnæus).
    Autumnal Parrot.
15. Conurus astec, Souance.
    Aztec Parakeet.
16. Piaya cayana thermophila (Sclater).
    Central American Squirrel Cuckoo.
17. Coccyzus minor (Gmelin).
    Mangrove Cuckoo.
18. Trogon ambiguus, Gould.
    Coppery-tailed Trogon.
19. Trogon melanocephalus, Gould.
    Black-headed Trogon.
20. Ceryle torquata (Linnæus).
    Ringed Kingfisher.
21. Campephilus guatemalensis (Hartlaub).
    Guatemalan Ivory-bill.
22. Ceophlœus scapularis (Vigors).
    Delattre's Woodpecker.
23. Chloronerpes æruginosus, Lichtenstein.
    Mexican Green Woodpecker.
24. Chlorostilbon caniveti (Lesson).
    Canivet's Emerald.
25. Platypsaris aglaiæ (Lafresnaye).
    Rose throated Becard.
26. Titrya personata (Jardine).
    Masked Titrya.
27. Tyrannus melancholicus couchi (Baird).
    Couch's Kingbird
28. Pitangus derbianus (Kaup).
    Derby Flycatcher; Kiskadee.
29. Myiozetetes texensis (Giraud).
    Giraud's Flycatcher; Little Kiskadee.
30. Megarhynchus pitangua (Linnæus).
    Broad-billed Kiskadee.
31. Myiarchus lawrenceii (Giraud)
    Lawrence's Flycatcher.
32. Ornithion imberbe (Sclater).
    Beardless Flycatcher.
33. Thamnophilus doliatus Mexicanus, (Allen).
    Mexican Ant Thrush.
34. Dendrornis flavigaster (Swainson).
    Ivory-billed Woodhewer.
35. Psilorhinus morio (Wagler.)
    Brown Jay.
36. Corvus Mexicanus, Gmelin.
    Mexican Crow.
37. Gymnostinops montezumæ (Lesson).
    Montezuma Yellow-tail

38. Amblycercus holosericeus (Lichtenstein).
Plantation Cassique.
39. Icterus gularis (Wagler).
Lesson's Oriole.
40. Spinus psaltria Mexicanus (Swainson.)
Mexican Goldfinch.
41. Passernia parellina (Bonaparte).
Blue Bunting.
42. Euethcia olivacea pusilla (Swainson).
Mexican Grassquit.
43. Pitylus celæno (Lichtenstein).
Mexican Pitylus.
44. Saltator atriceps, Lesson.
Black-headed Saltator.
45. Saltator grandis (Lichtenstein.)
Gray-backed Saltator.
46. Phœnicothraupis fuscicauda salvini (Berlepsch).
Salvin's Ant Tanager.
47. Piranga ludoviciana (Wilson).
Louisiana Tanager.
48. Tanagra abbas, Lichtenstein.
Northern Palm Tanager.
49. Euphonia hirundinacea, Bonaparte.
Swallow-billed Euphonia.
50. Euphonia affinis, Lesson.
Allied Euphonia.
51. Vireo solitarius (Wilson).
Blue-headed Vireo.
52. Helmitheros vermivorus (Gmelin).
Worm-eating Warbler.
53. Compsothlypis Americana (Linnæus).
Parula Warbler.
54. Geothlypis flavovelatus, Ridgway.
Alta Mira Yellow-throat.
55. Sylvania mitrata (Gmelin).
Hooded Warbler.
56. Sylvania pusilla (Wilson).
Wilson's Warbler.
57. Basileuterus culicivorus (Lichtenstein).
Brasher's Warbler.
58. Thryothorus maculipectus, Lafresnaye.
Spotted-breasted Wren.
59. Hemiura leucogastra (Gould).
Short-tailed Wren.
60. Merula Grayi (Bonaparte).
Gray's Robin.

The American Widgeon.

(*Anas Americana.*)

This beautiful duck is a familiar acquaintance with most sportsmen the country over. It is closely allied to the European Widgeon (*A. penelope*), which it resembles, with the exception that the European species is of a somewhat browner tint where the American is a handsome gray. Both species are prized for the table, the flavor being very delicate when the bird is in prime condition.

The American Widgeon breeds in the far north and only visits our waters during the spring and fall migrations. It belongs to the family *Anatinæ*, which includes the pond or river ducks among which are the mallard, widgeon, wood duck, teal, pintail and black duck, all of which are highly prized. The widgeon is a rapid flyer and it may be identified by its peculiar cry—a sort of snoring whistle rather faint in tone.

This duck is known by many names among the gunners of lake and seaboard. "Bald-pate," "bald-head," "white belly," "poacher," "bald-face" and "wheat-duck" are applied to it in different parts of the country. All but one of these names explain themselves, but the term "poacher" may not be so easily understood. It refers to the widgeon's method of securing dainty fare.

The widgeon seldom or never dives yet he is extremely fond of the white, tender root of the *Valisineria spiralis*, called by sportsmen "celery." As this plant grows on shoals at a depth of from seven to nine feet the coveted root can only be secured by diving; hence if he were not clever, the widgeon might never taste the dainty. But he is clever, and so he makes the celebrated canvasback do his diving.

The canvasback is a tireless diver and is also a glutton for the celery. The widgeon knows this, so he is forever hanging about near the feeding canvasback. When the larger duck rises to the surface with a root the alert widgeon snatches the prize and makes off before the honest worker has had time to apprehend what has happened. This playful eccentricity is the cause of considerable squabbling between the two species, but as the widgeon is crafty in action and swift in retreat he usually escapes with his ill-gotten booty and is ready to repeat the theft at the first opportuniry. The habit is the more curious because there is no question about the canvasback's ability to thrash the widgeon in short order should he ever catch him. —*Ed. W. Sandys in Outing for October.*

The Hummingbird.

One of the most wonderful characteristics of the hummingbird says Prof. O. B. Knight in the Maine Sportsman, is its ability to move backward in its flight, said to be the only instance in which a bird is able to accomplish that movement. Prof. Rideway says this movement is greatly assisted by a forward motion of the bird's expanded tail. The gaudy and rich plumage of the hummingbirds makes them tempting prizes for the collectors of bird skins, and it is, therefore. not strange they are slaughtered in such multitudes. Vast numbers are slain in Mexico and South America, being killed with fine shot or caught with nets and line. On account of this ruthless destruction some species are said to be on the verge of extinction, and, of course, it will be the most beautiful kinds that will be exterminated first. At a sale held in London on March 21, 1888, more than 12,000 hummer skins were disposed of, and in one week 40,000 hummers and other American birds were sold in London at auction. A brilliant hummer, flitting airily amid the foliage and flowers, is "a thing of beauty and a joy forever.' On a woman's bonnet such a decoration is little short of garish. All the colors of the spectrum, with many intermingled tints, are combined in their plumage, so that some of them seem to be truly a kaleidoscope. One of the most striking ornaments of many of the hummers is the "gorget," as it is called—that is, a gleaming throat patch of imbricated feathers. In the common ruby throat it is ruby, as the name implies; in several species, like Costa's hnmmingbird, the tips of the feathers are purple, and the basal portions snow white. In others they gleam in the most metallic red or violet. Sometimes the feathers of these gorgets are elongated into a beautiful ruff on each side of the neck or into a bearded tuft reaching down from the chin.

The Living Age being a weekly magazine, suffers somewhat by competition with the monthly magazines of the first class, if the comparison is made of single numbers. But *The Living Age* actually gives a larger amount of matter each month than any of the monthlies. Thus *Harper's Magazine* contains 182 pages each month; the *Century* 160 pages; *Scribner's Magazine* 128 pages; and *The Atlantic Monthly* 144 pages; while *The Living Age* gives each month from 280 to 344 pages, according as there were four or five issues.

The Elephant and the Giraffe.

BY CHARLOTTE OSGOOD CARTER.

Said the elephant to the giraffe:
"Your neck is too long by one-half,"
He replied, "Since your nose
Reaches down to your toes
At others you'd better not laugh."

—*St. Nicholas.*

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A copy will be sent free to any one sending us four subscribers and six dollars.

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Redhead	08	Killdeer	03	Barred Owl	15
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Red-shouldered Hawk	10	American Herring Gull	08	Green Heron	03
California Gull	08	Royal Tern	10	Barn Swallow	01
Caspian Tern	08	Marsh Hawk	08	Indigo Bird	02
Audubon's Shearwater	15	White Pelican	08	White-rumped Shrike	02
Sooty Tern	03	Barrows Goldeneye	08	Flicker	02
Noddy Tern	08	Murre	08	Song Sparrow	10
Limpkin	15	Wilson's Phalarope	15	Curve-bill Thrasher	02
Reddish Egret	08	Canada Goose	20	Sennett's Thrasher	02
Red-tail Hawk	10	American Elder	08	Black-billed Cuckoo	03
Wild Turkey	20	American Bittern	10	Mocker	02
White Ibis	08	Baird's Cormorant	08	Orchard Oriole	02
Sage Hen	08	Large-bill Puffin	15	Baltimore Oriole	02
Burrow Owl	06	Golden Eagle	1 00	Purple Grackle	02
Cooper's Hawk	08	Fulmar	10	Yellow Warbler	02
Laughing Gull	06	Western Grebe	08	Russet-backed Thrush	02
Flamingo	20	Blue-wing Teal	05	Spotted Sandpiper	03
Great Horned Owl	20	Spotted Owl	50	Snipe	10
Anhinga	06	Double-crested Cormorant	06	Red-billed Pigeon	10
American Osprey	15	Red-breasted Merganser	10	White-crowned Pigeon	10
Franklin Gull	08	Meadow Lark	02	Pied-billed Grebe	02
Canvasback	10	Brown Thrasher	01	Indigo Bird	02
Violet-green Cormorant	15	Quail	03	Wood Pewee	02
Mallard	06	Red-headed Woodpecker	02	Cowbird	01
American Magpie	03	Blue Jay	02	Leaches' Petrel	04
Farralone Cormorant	07	Rose-breasted Grosbeak	03	Black Tern	03
Screech Owl	10	Sora Rail	03	California Quail	01
Short-eared Owl	15	Common Tern	03	Virginia Rail	03
Manx Shearwater	10	Robin	01	Chuck-wills-widow	20
Red-bellied Hawk	15	California Towhee	02	Whip-poor-will	15
Florida Screech Owl	10	Bluebird	01	Purple Martin	02
Chachalaca	10	House Wren	01	Long-billed Marsh Wren	02
Black-necked Stilt	10	Crow	02	Yellow-breasted Chat	02
California Brown Pelican	12	Blue Jay	02	Afric. Ostrich, slightly cracked	50
California Murre	08	Mourning Dove	01		

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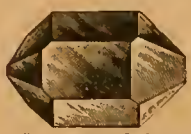

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